Australian Government

Department of Infrastructure, Transport, Regional Development, Communications and the Arts

Application for a Advisory notice for a thing that is not a road vehicle

This application summary is **not an approval notice**.

Application details

Application number	NARV-2025-0007621
Application type	New Approval
Application for	s47F
Submitted on	9/01/2025 10:17:46 AM
Submitted by	s47F

Vehicle details

Make	Other
Please specify make	Electric Bike
Model	ORACLE

When was the vehicle manufactured?

2024

Vehicle class

Which of the following vehicle classes does your thing belong to?

Motorised recreational device

Vehicle features

Does your vehicle have any of the following features?

☐ Direction indicators

☒ Brake lights

☐ Rear vision mirrors

☐ Registration plate mounting

☐ Seat belts

☐ Fully enclosed cabin with doors

☐ None of the above

Can your vehicle exceed a speed of 25 km/h on a flat road?

No

Advisory notice details

Please provide the manufacturer's brochure or specifications for the thing that is not a road vehicle.

Attachments

Screenshot 2025-01-09 at 9.08.03 AM.png	Add

Please upload images which identify the vehicle for which you are seeking an advisory notice. This should include front, side and rear images in order to provide coverage of the whole vehicle.

Attachments

DSC00895.jpg	Add
DSC00911.JPG	Add
DSC01030.jpg	Add
DSC00804.JPG	Add
DSC00835.JPG	Add
DSC00849.JPG	Add
DSC00999.JPG	Add
DSC00968.JPG	Add
DSC01004.JPG	Add

Comments and any other matters

Please provide any comments or additional information to support your application below. You may also upload any relevant supporting documentation, if required.

Hi,

We have had three other ROVER applications approved for very similar products.
Main differences is this product has better specs and a new frame.

Thank you for your assistance.

s47F

Declarations

I declare that the information supplied is true, complete and accurate and that the applicant has not omitted any matter or thing without which the application would be misleading in any material particular. I understand that it may be a contravention under section 32 of the Act to provide false or misleading information.

I understand that further information may be requested to support this application.

I understand that the Secretary may refuse to consider this application, if the application is not accompanied by the documents specified as required in the application and the application fee.

(and) If submitting the application on behalf of the applicant, an agent or broker will also complete the following declaration:

I am authorised by the applicant to make this declaration on their behalf.

☒ I, being the applicant, or the person authorised to make the declaration on behalf of the applicant, agree to the above and by checking this box, I acknowledge that I am signing this declaration.

1)52V 1000W motor; Bafang
2)52V 25A battery; Samsung
3)52V30A Sine wave controller; Bluedot
4) APT 860C display.
5) Front light, Customized LED fat tire ebike light
6) 52V3A charger, SAA; Sans
7) Split handle bar， Oracle new style handle bar
8) Fork: Air pressure,adjustable suspension fork
9) Hydrualic brake, 203mm rotor; TEKTRO HD-E3490
10) Fender: split plastic fenders
11) Gear: 7 speeds; Shimano
12) 20*4.0 fat tire,VEE HUNTSMAN
13) Half turn throotle; Star union
14) Add a pair of side panel; aluminum alloy
15) Rear Rack
16) Cup holder
17) Seat: half black, half brown seats
18) Customization： display; frame LOGO; side laser cutting; package; seat; battery; wheel reflector;padel reflector

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15) Rear Rack&Midlle foot rest
16) Cup holder
17) Seat: half black, half brown seats
18) Customization： display; frame LOGO; side laser cutting; package; seat; battery; wheel reflector;padel reflector

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Total Bill:					s47G(1)(a)	

Australian Government

Department of Infrastructure, Transport, Regional Development, Communications and the Arts

s47F

VSS.NCE.15.01.01

Decision to issue an Advisory notice that a thing is not a road vehicle
Road Vehicle Standards Rules 2019, section 233

Advisory notice number NARV-2025-0007621

I, s22(1)(a)(ii) have decided to issue s47F an Advisory notice that a thing is not a road vehicle (Advisory notice) under section 233 of the Road Vehicle Standards Rules 2019 (the Rules) on the basis that I am satisfied that the vehicle applied for is not a road vehicle.

Certain restrictions may apply to using vehicles that are not road vehicles on public roads or road related areas in your local community. Your state or territory transport authority will have further information about any requirements.

When collecting your vehicle please provide this letter to the Australian Border Force for clearance and validation that the department has assessed your application and deemed your vehicle not to be a road vehicle.

Vehicles that are not road vehicles must not be supplied to the market or sold to another person or business for use in transport on public roads within the meaning of the Road Vehicle Standards Act 2018; doing so may be an offence under Road Vehicle Standards legislation. Any false or misleading information provided to support your application may make you liable under the Act as committing an offence.

This Advisory notice comes into force from the date of this decision. This notice expires two (2) years from the date it is issued.

The Advisory notice will not be published on our website but the Secretary (or delegate) may disclose it to others in limited circumstances, for example to assist other regulators, or under a Freedom of Information request (in some circumstances), or subpoena.

Note: Goods containing asbestos

Importation to Australia of asbestos, or goods containing asbestos, is prohibited pursuant to Regulation 4C of the Customs (Prohibited Imports) Regulations 1956 unless a permission or exemption has been granted or a lawful exemption applies.

https://www.abf.gov.au/prohibited-goods-subsite/files/fs-asbestos-risk-importing-vehicle.pdf

Description of vehicle

Vehicle	Make	Model
Motorised recreational device	Burzerk	ORACLE

If the vehicle identified in this notice has a VIN, and that VIN is on the RAV, then this notice is not applicable to the vehicle.

Any change to the design and/or specifications of this vehicle prior to importation will mean that the Notice is not applicable.

Contact us

For further information, please consult the contact us information on the website for the department.

s22(1)(a)(ii)

Delegate of the Secretary
Vehicle Safety Operations Branch
Department of Infrastructure, Transport, Regional Development, Communications and the Arts

20/01/2025

Australian Government

Department of Infrastructure, Transport, Regional Development, Communications and the Arts

Application for a Advisory notice for a thing that is not a road vehicle

This application summary is **not an approval notice**.

Application details

Application number	NARV-2024-0007540
Application type	New Approval
Application for	s47F
Submitted on	3/01/2025 10:45:09 AM
Submitted by	s47F

Vehicle details

Make	Other
Please specify make	MACFOX
Model	M21 (X2)

When was the vehicle manufactured?

2024

Vehicle class

Which of the following vehicle classes does your thing belong to?

Other

What is this vehicle designed to be used for?

Fat tyre E-Bike, with pedals, 750w rear hub Motor, electronically limited to 25kph and 250w. Dual Batteries with a total weight of 45kg

Vehicle features

Does your vehicle have any of the following features?

☒ Direction indicators

☒ Brake lights

☐ Rear vision mirrors

☐ Registration plate mounting

☐ Seat belts

☐ Fully enclosed cabin with doors

☐ None of the above

Can your vehicle exceed a speed of 25 km/h on a flat road?

No

Advisory notice details

Please provide the manufacturer's brochure or specifications for the thing that is not a road vehicle.

Attachments

MACFOX-X2 (Goanna).pdf	Add

Please upload images which identify the vehicle for which you are seeking an advisory notice. This should include front, side and rear images in order to provide coverage of the whole vehicle.

Attachments

1 (1).PNG	Add
DSC03430.png	Add
DSC03433.png	Add

Comments and any other matters

Please provide any comments or additional information to support your application below. You may also upload any relevant supporting documentation, if required.

Attachments

EL-M21-GCC.pdf	Add
EL-M21 UL 2849 Report.pdf	Add
S03A23120368M00201 易联科 EL-YW1304S MSDS(1).pdf	Add

Declarations

I declare that the information supplied is true, complete and accurate and that the applicant has not omitted any matter or thing without which the application would be misleading in any material particular. I understand that it may be a contravention under section 32 of the Act to provide false or misleading information.

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MACFOX X2

Designed for the Adventure-seekers

Dual Battery Version

Color ● ●

MACFOX X2 Specification

Top Speed	25kph Limi+ed 45kph Offroad Only use	Vehicle Weight	30kgs
Range	~115km	Length x Width x Height	142x45x88cm
		Rider Weight Limit	150kg
		Seat Height	84cm
Charge Time	5-6 hrs per ba++ery	Frame	Aluminum
Battery	1500W/H (2 x 48V 20ah)	Suspension (if applicable)	Front + Rear
Motor	750w nominal / 1000w peak	Brakes	Hydraulic
		Tires	20"*4.0" CST Tires
Throttle	Twist Throttle Op+ional	Head Light	LCD
Gearing & Rear Derailleur	Shimano 7 gear	Tail Light	LCD

MACFOX

Redefining Urban Mobility

At MACFOX, powered by our parent company E-LiNKTECH, we are at the forefront of a revolution in urban mobility. Our mission is to transform the way people navigate the cityscape, combining cutting-edge technology, sleek design, and unparalleled performance in every e-bike we create. Whether you're commuting to work, exploring new neighborhoods, seeking the thrill of urban adventure, or customizing your street bike, MACFOX E-Bike is your perfect companion.

The MACFOX Experience

MACFOX E-Bike is not just a mode of transportation; it's a lifestyle. Our e-bikes are designed for young, dynamic individuals who crave excitement and freedom. The streets are your playground, and with MACFOX, you can experience it like never before. From daily commutes to weekend adventures, our e-bikes offer versatility, reliability, and a whole lot of fun. For those who love tinkering and personalizing their rides, our street bikes are perfect for DIY enthusiasts.

Customization and Community

At MACFOX, we understand that every rider is unique. That's why our e-bikes are highly customizable, allowing you to tailor your ride to your personal style and needs. From custom paint jobs to advanced tech upgrades, the possibilities are endless. Join a community of passionate riders who share tips, tricks, and DIY projects, pushing the boundaries of what's possible with an e-bike.

Powered by E-LiNKTECH, we bring you the best in electric mobility.

HUAK TESTING

TEST REPORT

Prepared for:

E-Link Technology Co., Ltd

4-5 Floor, BL.B Tongwei Optoelectronics Factory Area,No.8, Gongye 2nd Road, Shilong, Shiyan Street 518108,Bao'an district, Shenzhen

Product Name:	**Electric bicycle**
Model Name:	**EL-M21, EL-M21-1, EL-M21-2, EL-M21-3, EL-M21-4, EL-M21-5, EL-M21-6, EL-M21-7, EL-M21-8, EL-M21-9, EL-M21-10**
Trade Mark:	MACFOX
Date of Test:	**From June 16, 2023 to July 21, 2023**
Date of Report:	**March 04, 2024**
Report Number:	**HK2306166272-1RR**

Prepared by:

Shenzhen HUAK Testing Technology Co., LTD.

1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

TEL : +86-755 2302 9901 FAX : +86-755 2302 9901 E-mail : service@cer-mark.com

Add: 1-2F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

HUAK TESTING

TEST REPORT

Applicant:	**E-Link Technology Co., Ltd**
Address:	**4-5 Floor, BL.B Tongwei Optoelectronics Factory Area,No.8, Gongye 2nd Road, Shilong, Shiyan Street 518108,Bao'an district, Shenzhen**
Manufacturer:	**E-Link Technology Co., Ltd**
Address:	**4-5 Floor, BL.B Tongwei Optoelectronics Factory Area,No.8, Gongye 2nd Road, Shilong, Shiyan Street 518108,Bao'an district, Shenzhen**

The following sample was submitted and identified by/on behalf of the client as:

Sample Name:	Electric bicycle
Model No.:	EL-M21, EL-M21-1, EL-M21-2, EL-M21-3, EL-M21-4, EL-M21-5, EL-M21-6, EL-M21-7, EL-M21-8, EL-M21-9, EL-M21-10
Trade Mark:	MACFOX
Tested Age Grade:	16+ years old
Labeled Age Grading:	16+ years old
Appropriate Age Grade:	16+ years old
Sample Receiving Date:	June 16, 2023
Testing Period:	From June 16, 2023 to July 21, 2023
Results:	Please refer to next page(s).

****

Signed for and on behalf of HUAK

Approved by: s47F

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Add: 1-2F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

HUAK TESTING

TEST REPORT

Information of the Test Laboratory

Shenzhen HUAK Testing Technology Co., Ltd.

Add.: 1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

Testing Laboratory Authorization：

A2LA Accreditation Code is 4781.01.

FCC Designation Number is CN1229.

Canada IC CAB identifier is CN0045.

CNAS Registration Number is L9589.

CPSC Certification Number is 1710.

****

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HUAK TESTING

TEST REPORT

Summary of Test Results:

	TEST REQUEST	CONCLUSION
A	As specified in title 16, code of federal regulations, chapter II- consumer products safety commission of U.S.A	
	16 CFR 1500.50.51.52.53 Simulating use and abuse of toys	PASS
B	16 CFR Part 1512 Requirements For Bicycles	PASS
C	- USA 16 CFR Part 1303 Ban of Lead Containing Paint and Certain Consumer Products Bearing Lead- Containing Paint	PASS
D	- USA Consumer Product Safety Improvement Act (CPSIA) Sec.101 Children´s products containing Lead; Lead paint rule	PASS
E	- USA Consumer Product Safety Improvement Act (CPSIA) Sec.108 Prohibition on sale of certain products containing specified phthalates - USA 16 CFR Part 1307 Prohibition of Children's Toys and Child Care Articles Containing Specified Phthalates	PASS
F	-CPSA Section 14(a) (5) Tracking Labels for Children's Products (15 USC §2063(a)(5) (CPSA))	PASS

****

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Results:

A.1 As specified in title 16, code of federal regulations, chapter II- consumer products Safety commission of U.S.A

Applicable Section	Description	Result
16 CFR 1500.50.51.52.53	Normal use testing	Pass
	Abuse testing	
	Impact test(53b)	Pass
	Bite test	Pass
	Flexure test	Pass
	Torque test (53e)	Pass
	Tension test (53f)	Pass
	Compression test(53g)	Pass

- NA = Not Applicable

****

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TEST REPORT

B. 16 CFR Part 1512 Requirements for Bicycles

Applicable Section	Description	Result
1512.3	**Requirements in general.**	
	Any bicycle subject to the regulations in this part shall meet the requirements of this part in the condition to which it is offered for sale to consumers; any bicycle offered for sale to consumers in disassembled or partially assembled condition shall meet these requirements after assembly according to the manufacturer's instructions. For the purpose of compliance with this part, where the metric and English units are not equal due to the conversion process the less stringent requirement will prevail.	Pass
1512.4	**Mechanical requirements.**	
(a)	Assembly. Bicycles shall be manufactured such that mechanical skills required of the consumer for assembly shall not exceed those possessed by an adult of normal intelligence and ability.	Pass
(b)	Sharp edges. There shall be no unfinished sheared metal edges or other sharp parts on assembled bicycles that are, or may be, exposed to hands or legs; sheared metal edges that are not rolled shall be finished so as to remove any feathering of edges, or any burs or spurs caused during the shearing process.	Pass
(c)	Integrity. There shall be no visible fracture of the frame or of any steering, wheel, pedal, crank, or brake system component resulting from testing in accordance with: The handbrake loading and performance test, 8 1512.18(d); the foot brake force and performance test, S 1512.18(e); and the road test, 1512. 18(p) (or the sidewalk bicycle proof test, S 1512.18(q)).	Pass
(d)	Attachment hardware. All screws, bolts, or nuts used to attach or secure components shall not fracture, loosen, or otherwise fail their intended function during the tests required in this part. All threaded hardware shall be of sufficient quality to allow adjustments and maintenance. Recommended quality thread form is specified in Handbook H28, “Screw Thread Standards for Federal Service,”[1] issued by the National Bureau of Standards, Department of Commerce; recommended mechanical properties are specified in ISO Recommendation R898, “Mechanical Properties of Fasteners,” and in ISO Recommendations 68, 262, and 263, “General Purpose Screw Threads.”[2]	Pass
(e)-(f)	[Reserved]	NA
(g)	Excluded area. There shall be no protrusions located within the area bounded by (1) a line 89 mm (31/2 in) to the rear of and parallel to the handlebar stem; (2) a line tangent to the front tip of the seat and intersecting the seat mast at the top rear stay;(3) the top surface of the top tube; and (4) a line connecting the front of the seat (when adjusted to its highest position) to the junction where the handlebar is attached to the handlebar stem. The top tube on a female bicycle model shall be the seat mast and the down tube or tubes that are nearest the rider in the normal riding position. Control cables no greater than 6.4 mm (1/4 in) in diameter and cable clamps made from material not thicker than 4.8 mm (3/16 in) may be attached to the top tube.	Pass

TEST REPORT

Applicable Section	Description	Result
(h)	[Reserved]	NA
(i)	Control cable ends. Ends of all accessible control cables shall be provided with protective caps or otherwise treated to prevent unraveling. Protective caps shall be tested in accordance with the protective cap and end-mounted devices test, § 1512.18(c), and shall withstand a pull of 8.9 N (2.0 lbf).	Pass
(j)	Control cable abrasion. Control cables shall not abrade over fixed parts and shall enter and exit cable sheaths in a direction in line with the sheath entrance and exit so as to prevent abrading.	Pass
1512.5	**Requirements for braking system.**	
(a)	Braking system. Bicycles shall be equipped with front- and rear-wheel brakes or rear-wheel brakes only.	Pass
(b)	Handbrakes. Handbrakes shall be tested at least ten times by applying a force sufficient to cause the hand lever to contact the handlebar, or a maximum of 445 N (100 lbf), in accordance with the loading test, § 1512.18(d)(2), and shall be rocked back and forth with the weight of a 68.1 kg (150 lb) rider on the seat with the same handbrake force applied in accordance with the rocking test, § 1512.18(d)(2)(iii); there shall be no visible fractures, failures, movement of clamps, or misalignment of brake components.	Pass
(1)	Stopping distance. A bicycle equipped with only handbrakes shall be tested for stopping distance by a rider of at least 68.1 kg (150 lb) weight in accordance with the performance test, § 1512.18(d)(2) (v) and (vi), and shall have a stopping distance of no greater than 4.57 m (15 ft) from the actual test speed as determined by the equivalent ground speed specified in § 1512.18(d)(2)(vi).	Pass
(2)	Hand lever access. Hand lever mechanisms shall be located on the handlebars in a position that is readily accessible to the rider when in a normal riding position.	Pass
(3)	Grip dimension. The grip dimension (maximum outside dimension between the brake hand lever and the handlebars in the plane containing the centerlines of the handgrip and the hand brake lever) shall not exceed 89 mm (31/2 in) at any point between the pivot point of the lever and lever midpoint; the grip dimension for sidewalk bicycles shall not exceed 76 mm (3 in). The grip dimension may increase toward the open end of the lever but shall not increase by more than 12.7 mm (1/2 in) except for the last 12.7 mm (1/2 in) of the lever. (See figure 5 of this part 1512.)	Pass
(4)	Attachment. Brake assemblies shall be securely attached to the frame by means of fasteners with locking devices such as a lock washer, locknut, or equivalent and shall not loosen during the rocking test, § 1512.18(d)- (2)(iii). The cable anchor bolt shall not cut any of the cable strands.	Pass
(5)	Operating force. A force of less than 44.5 N (10 lbf) shall cause the brake pads to contact the braking surface of the wheel when applied to the hand lever at a point 25 mm (1.0 in) from the open end of the hand lever.	Pass
(6)	Pad and pad holders. Caliper brake pad shall be replaceable and adjustable to engage the braking surface without contacting the tire or spokes and the pad holders shall be securely attached to the caliper assembly. The brake pad material shall be retained in its holder without movement when the bicycle is loaded with a rider of at least 68.1 kg (150 lb) weight and is rocked forward and backward as specified in the rocking test, § 1512.18(d)(2)(iii).	Pass

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TEST REPORT

Applicable Section	Description	Result
(7)	[Reserved]	NA
(8)	Hand lever location. The rear brake shall be actuated by a control located on the right handlebar and the front brake shall be actuated by a control located on the left handlebar. The left-hand/right-hand locations may be reversed in accordance with an individual customer order. If a single hand lever is used to actuate both front and rear brakes, it shall meet all applicable requirements for hand levers and shall be located on either the right or left handlebar in accordance with the customer's preference.	Pass
(9)	Hand lever extensions. Bicycles equipped with hand lever extensions shall be tested with the extension levers in place and the hand lever extensions shall also be considered to be hand levers.	Pass
(c)	Footbrakes. All footbrakes shall be tested in accordance with the force test, § 1512.18(e)(2), and the measured braking force shall not be less than 178 N (40 lbf) for an applied pedal force of 310 N (70 lbf).	Pass
(1)	Stopping distance. Bicycles equipped with footbrakes (except sidewalk bicycles) shall be tested in accordance with the performance test, § 1512.18(e)(3), by a rider of at least 68.1 kg (150 lb) weight and shall have a stopping distance of no greater than 4.57 m (15 ft) from an actual test speed of at least 16 km/h (10 mph). If the bicycle has a footbrake only and the equivalent groundspeed of the bicycle is in excess of 24 km/h (15 mph) (in its highest gear ratio at a pedal crank rate of 60 revolutions per minute),[3] the stopping distance shall be 4.57 m (15 ft) from an actual test speed of 24 km/h (15 mph) or greater.	Pass
(2)	Operating force. Footbrakes shall be actuated by a force applied to the pedal in a direction opposite to that of the drive force, except where brakes are separate from the drive pedals and the applied force is in the same direction as the drive force.	Pass
(3)	Crank differential. The differential between the drive and brake positions of the crank shall be not more than 60° with the crank held against each position under a torque of no less than 13.6 N-m (10 ft-lb).	Pass
(4)	Independent operation. The brake mechanism shall function independently of any drive-gear positions or adjustments.	Pass
(d)	Footbrakes and handbrakes in combination. Bicycles equipped with footbrakes and handbrakes shall meet all the requirements for footbrakes in § 1512.5(c), including the tests specified. In addition, if the equivalent ground speed of the bicycle is 24 km/h (15 mph) or greater (in its highest gear ratio at a pedal crank rate of 60 revolutions per minute),3 the actual test speed specified in § 1512.18(e)(3) shall be increased to 24 km/h (15 mph) and both braking systems may be actuated to achieve the required stopping distance of 4.57 m (15 ft).	Pass
(e)	Sidewalk bicycles. (1) Sidewalk bicycles shall not have handbrakes only.(2) Sidewalk bicycles with a seat height of 560 mm (22 in) or greater (with seat height adjusted to its lowest position) shall be equipped with a footbrake meeting all the footbrake requirements of § 1512.5(c), including the specified tests except that the braking force transmitted to the rear wheel shall be in accordance with the sidewalk bicycle footbrake force tests, § 1512.18(f).(3) Sidewalk bicycles with a seat height less than 560 mm (22 in) (with seat height adjusted to its lowest position) and not equipped with a brake shall not	Pass

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TEST REPORT

Applicable Section	Description	Result
	have a freewheel feature. Such sidewalk bicycles equipped with a footbrake shall be tested for brake force in accordance with the sidewalk bicycle footbrake force test, § 1512.18(f). Such sidewalk bicycles not equipped with brakes shall be identified with a permanent label clearly visible from a distance of 3.1 m (10 ft) in daylight conditions and promotional display material and shipping cartons shall prominently display the words "No Brakes."	
1512.6	**Requirements for steering system.**	
(a)	Handlebar stem insertion mark. Quill-type handlebar stems shall contain a permanent ring or mark which clearly indicates the minimum insertion depth of the handlebar stem into the fork assembly. The insertion mark shall not affect the structural integrity of the stem and shall not be less than 21/2 times the stem diameter from the lowest point of the stem. The stem strength shall be maintained for at least a length of one shaft diameter below the mark.	Pass
(b)	Handlebar stem strength. The handlebar stem shall be tested for strength in accordance with the handlebar stem test, § 1512.18(g), and shall withstand a force of 2000 N (450 lbf) for bicycles and 1000 N (225 lbf) for sidewalk bicycles.	Pass
(c)	Handlebar. Handlebars shall allow comfortable and safe control of the bicycle. Handlebar ends shall be symmetrically located with respect to the longitudinal axis of the bicycle and no more than 406 mm (16 in) above the seat surface when the seat is in its lowest position and the handlebar ends are in their highest position. This requirement does not apply to recumbent bicycles.	Pass
(d)	Handlebar ends. The ends of the handlebars shall be capped or otherwise covered. Handgrips, end plugs, control shifters, or other end-mounted devices shall be secure against a removal force of no less than 66.8 N (15 lbf) in accordance with the protective cap and end-mounted devices test, § 1512.18(c).	Pass
(e)	Handlebar and clamps. The handlebar and clamps shall be tested in accordance with the handlebar test, § 1512.18(h). Directions for assembly of the bicycle required in the instruction manual by § 1512.19(a)(2) shall include an explicit warning about the danger of damaging the stem-to-fork assembly and the risk of injury to the rider that can result from over tightening the stem bolt or other clamping device. The directions for assembly shall also contain a simple, clear, and precise statement of the procedure to be followed to avoid damaging the stem-to-fork assembly when tightening the stem bolt or other clamping device.	Pass
1512.7	**Requirements for pedals.**	
(a)	Construction. Pedals shall have right-hand/left-hand symmetry. The tread surface shall be present on both top and bottom surfaces of the pedal except that if the pedal has a definite preferred position, the tread surface need only be on the surface presented to the rider's foot.	Pass
(b)	Toe clips. Pedals intended to be used only with toe clips shall have toe clips securely attached to them and need not have tread surfaces. Pedals designed for optional use of toe clips shall have tread surfaces.	Pass
(c)	Pedal reflectors. Pedals for bicycles other than sidewalk bicycles shall have reflectors in accordance with § 1512.16(e). Pedals for sidewalk bicycles are not required to have reflectors.	Pass

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TEST REPORT

Applicable Section	Description	Result
1512.8	**Requirements for drive chain**. The drive chain shall operate over the sprockets without catching or binding. The tensile stength of the drive chain shall be no less than 8010 N (1,800 lbf) or 6230 N (1,400 lbf) for sidewalk bicycles.	Pass
1512.9	**Requirements for protective guards.**	
(a)	Chain guard. Bicycles having a single front sprocket and a single rear sprocket shall have a chain guard that shall cover the top strand of the chain and at least 90° of the perimeter where the drive chain contacts the drive sprocket as shown in figure 7. The chain guard shall extend rearward to a point at least 8 cm (3.2 in.) forward of the centerline of the rear axle. The minimum width of the top area of the chain guard shall be twice the width of the chain in that portion forward of the rear wheel rim. The rear part of the top area may be tapered. The minimum width at the rear of the guard shall be one-half the chain width. Such chain guard shall prevent a rod of 9.4 mm (3/8 in.) diameter and 76 mm (3.0 in.) length from entrapment between the upper junction of the chain and the sprocket when introduced from the chain side of the bicycle in any direction within 45° from a line normal to the sprocket.	Pass
(b)	Derailleur guard. Derailleurs shall be guarded to prevent the drive chain from interfering with or stopping the rotation of the wheel through improper adjustments or damage.	Pass
1512.10	**Requirements for tires**. The manufacturer's recommended inflation pressure shall be molded into or onto the sidewall of the tire in lettering no less than 3.2 mm (1/8 in.) in height. The statement of recommended inflation pressure shall be in the English language utilizing Arabic numerals. (The following language is suggested to indicate recommended inflation pressure: "Inflate to __ PSI.") After inflation to 110 percent of the recommended inflation pressure, the tire shall remain intact on the rim, including while being tested under a load of 2,000 N (450 lbf) in accordance with the rim test, § 1512.18(j). Tubular sew-up tires, nonpneumatic tires, and nonmolded wired-on tires are exempt from this section.	Pass
1512.11	**Requirements for wheels.**	
(a)	Spokes. There shall be no missing spokes.	Pass
(b)	Alignment. The wheel assembly shall be aligned such that no less than 1.6 mm (1/16 in.) clearance exists between the tire and fork or any frame member when the wheel is rotated to any position.	Pass
(c)	Rims. Rims shall retain the spokes and tire when side-loaded with 2000 N (450 lbf) and tested in accordance with the rim test, § 1512.18(j). Sidewalk bicycles need not meet this requirement.	Pass
1512.12	**Requirements for wheel hubs.** All bicycles (other than sidewalk bicycles) shall meet the following requirements:	
(a)	Locking devices. Wheels shall be secured to the bicycle frame with a positive lock device. Locking devices on threaded axles shall be tightened to the manufacturer's specifications.	Pass
(1)	Rear wheels. There shall be no relative motion between the axle and the frame when a force of 1,780 N (400 lbf) is applied symmetrically to the axle for a period of 30 seconds in the direction of wheel removal.	Pass
(2)	Front wheels. Locking devices, except quick-release devices, shall withstand	Pass

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TEST REPORT

Applicable Section	Description	Result
	application of a torque in the direction of removal of 17 N-m (12.5 ft-lb).	
(b)	Quick-release devices. Lever-operated, quick-release devices shall be adjustable to allow setting the lever position for tightness. Quick-release levers shall be clearly visible to the rider and shall indicate whether the levers are in a locked or unlocked position. Quick-release clamp action shall emboss the frame or fork when locked, except on fiber reinforced plastics.	Pass
(c)	Front hubs. Front hubs not equipped with lever-operated quick-release devices shall have a positive retention feature that shall be tested in accordance with the front hub retention test, § 1512.18(j)(3), to assure that when the locking devices are released the wheel will not separate from the fork.	Pass
1512.13	**Requirements for front fork.** The front fork shall be tested for strength by application of at least 39.5 J (350 in-lb) of energy in accordance with the fork test, § 1512.18(k)(1), without visible evidence of fracture. Sidewalk bicycles need not meet this requirement.	Pass
1512.14	**Requirements for fork and frame assembly.** The fork and frame assembly shall be tested for strength by application of a load of 890 N (200 lbf) or at least 39.5 J (350 in-lb) of energy, whichever results in the greater force, in accordance with the frame test, § 1512.18(k)(2), without visible evidence of fracture or frame deformation that significantly limits the steering angle over which the wheel can be turned. Sidewalk bicycles are exempt from this section.	Pass
1512.15	**Requirements for seat.**	
(a)	Seat limitations. No part of the seat, seat supports, or accessories attached to the seat shall be more than 125 mm (5.0 in) above the top of the seat surface at the point where the seat surface is intersected by the seat post axis. This requirement does not apply to recumbent bicycles.	Pass
(b)	Seat post. The seat post shall contain a permanent mark or ring that clearly indicates the minimum insertion depth (maximum seat-height adjustment); the mark shall not affect the structural integrity of the seat post. This mark shall be located no less than two seat-post diameters from the lowest point on the post shaft, and the post strength shall be maintained for at least a length of one shaft diameter below the mark. This requirement does not apply to bicycles with integrated seat masts, however, a permanent mark or other means to clearly indicate that the seat or seat posts is safely installed shall be provided.	Pass
(c)	Adjustment clamps. The seat adjustment clamps shall be capable of securing the seat in any position to which it can be adjusted and preventing movement of the seat in any direction under normal conditions of use. Following the road test, § 1512.18(p) (or the sidewalk bicycle proof test, § 1512.18(q), as applicable), the seat clamps shall be tested in accordance with the seat adjustment clamps and load test, § 1512.18(l).	Pass
1512.16	**Requirements for reflectors.** Bicycles shall be equipped with reflective devices to permit recognition and identification under illumination from motor vehicle headlamps. The use of reflector combinations off the center plane of the bicycle (defined in § 1512.18(m)(2)) is acceptable if each reflector meets the requirements of this section and of § 1512.18 (m) and (n) and the combination of reflectors has a clear field of view of ±10° vertically and ±50° horizontally. Sidewalk bicycles are not required to have reflectors.	

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TEST REPORT

Applicable Section	Description	Result
(a)	Front, rear, and pedal reflectors. There shall be an essentially colorless front-facing reflector, essentially colorless or amber pedal reflectors, and a red rear-facing reflector.	Pass
(b)	Side reflectors. There shall be retroreflective tire sidewalls or, alternatively, reflectors mounted on the spokes of each wheel, or, for non-caliper rim brake bicycles, retroreflective wheel rims. The center of spoke-mounted reflectors shall be within 76 mm (3.0 in.) of the inside of the rim. Side reflective devices shall be visible on each side of the wheel.	Pass
(c)	Front reflector. The reflector or mount shall not contact the ground plane when the bicycle is resting on that plane in any orientation. The optical axis of the reflector shall be directed forward within 5° of the horizontal-vertical alignment of the bicycle when the wheels are tracking in a straight line, as defined in § 1512.18(m)(2). The reflectors and/or mounts shall incorporate a distinct, preferred assembly method that shall insure that the reflector meets the optical requirements of this paragraph (c) when the reflector is attached to the bicycle. The front reflector shall be tested in accordance with the reflector mount and alignment test, § 1512.18(m).	Pass
(d)	Rear reflector. The reflector or mount shall not contact the ground plane when the bicycle is resting on that plane in any orientation. The reflector shall be mounted such that it is to the rear of the seat mast with the top of the reflector at least 76 mm (3.0 in) below the point on the seat surface that is intersected by the line of the seat post. The optical axis of the reflector shall be directed rearward within 5° of the horizontal-vertical alignment of the bicycle when the wheels are traveling in a straight line, as defined in § 1512.18(m)(2). The reflectors and/or mounts shall incorporate a distinct, preferred assembly method that shall insure that the reflector meets the optical requirements of this paragraph (d) when the reflector is attached to the bicycle. The rear reflector shall be tested in accordance with the reflector mount and alignment test, § 1512.18(m).	Pass
(e)	Pedal reflectors. Each pedal shall have reflectors located on the front and rear surfaces of the pedal. The reflector elements may be either integral with the construction of the pedal or mechanically attached, but shall be sufficiently recessed from the edge of the pedal, or of the reflector housing, to prevent contact of the reflector element with a flat surface placed in contact with the edge of the pedal.	Pass
(f)	Side reflectors. Reflectors affixed to the wheel spokes shall be mounted either flat on the spokes or within the spoke cage such that the angle between the optical axis and the normal to the plane of the wheel shall not exceed the angle of the spokes with the plane of the wheel. The reflectors shall not interfere with any wheel adjustments. The side-mounted reflector devices shall be essentially colorless or amber on the front wheel and essentially colorless or red on the rear wheel.	Pass
(g)	Reflector tests. The pedal, front-mount, rear-mount, and side-mount reflectors shall be tested in accordance with the reflector test, § 1512.18(n), to assure the reflectance values over the angles given in tables 1 and 2.	Pass
(h)	Retro reflective tire sidewalls. When retro reflective tire sidewalls are used in lieu of spoke-mounted reflectors, the reflecting material shall meet the following requirements:(1) The retro reflective material shall form a continuous circle on the sidewall. (2) The retro reflective material shall adhere to the tire	Pass

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TEST REPORT

Applicable Section	Description	Result
	such that after the tire has been subjected to a temperature of 50° ±3 °C (122° ±5.4 °F) for 30 minutes, the retro reflective material cannot be peeled or scraped away without removal of tire material. (3) The retroreflective material shall be as resistant to abrasion as is the adjacent sidewall material so that when retroreflective material is removed from the inflated tire by abrasion with a wet, steel bristle brush, tire material will be removed along with the retroreflective material. (4)The retroreflective material shall be tested for performance in accordance with the retroreflective tire test, § 1512.18(o), to assure the reflectance properties over the angles given in table 3. When a portion of the retroreflective material is selected (and the remainder is masked as specified in § 1512.18(o)(2)(i)), the selected portion shall not contact the ground plane when the assembled bicycle is resting on that plane in any orientation.	
(i)	Retro reflective rims. When retroreflective rims are used in lieu of spoke-mounted reflectors or retroreflective tire sidewalls, the reflecting material shall meet the following requirements(1) The retroreflective material shall form a continuous circle on the rim. (2) If the retroreflective material is applied to the rim in the form of a self-adhesive tape, the following requirement must be met: Use a sharp knife, razor blade, or similar instrument to carefully release an end of the tape material sufficient to be grasped between the thumb and finger. Grasp the freed tape end and gradually pull in a direction 90° to the plane of the rim. The tape material must break before additional separation (peeling) from the rim is observed. (3) After the retroreflective material is abraded in accordance with the abrasion test for retroreflective rims at § 1512.18(r), the rim must then be tested for performance in accordance with the retroreflective tire and rim test at § 1512.18(o), to assure the reflectance properties over the angles given in table 3.	Pass
1512.17	**Other requirements.**	
(a)	Road test. Bicycles, other than sidewalk bicycles, shall be ridden at least 6.4 km (4.0 mi.) by a rider weighing at least 68.1kg (150 lb.) and travel five times over a 30.5 m (100 ft.) cleated course in accordance with the road test, § 1512.18(p), and shall exhibit stable handling, turning, and steering characteristics without difficulty of operation. There shall be no system or component failure of the structure, brakes, or tires, and there shall be no loosening or misalignment of the seat, handlebars, controls, or reflectors during or resulting from this test.	Pass
(b)	Sidewalk bicycle proof test. Sidewalk bicycles shall be dropped a distance of at least 300 mm (1.0 ft.) three times onto a paved surface with weights attached in accordance with the sidewalk bicycle proof test, § 1512.18(q). There shall be no fracture of wheels, frame, seat, handlebars, or fork during or resulting from this test.	Pass
(c)	Ground clearance. With the pedal horizontal and the pedal crank in its lowest position and any training wheels removed, it shall be possible to tilt the bicycle at least 25° from the vertical without the pedal or any other part (other than tires) contacting the ground plane.	Pass
(d)	Toe clearance. Bicycles not equipped with positive foot-retaining devices (such as toe clips) shall have at least 89 mm (31/2 in) clearance between the pedal and the front tire or fender (when turned to any position). The clearance	Pass

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Add: 1-2F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

TEST REPORT

Applicable Section	Description	Result
	shall be measured forward and parallel to the longitudinal axis of the bicycle from the center of either pedal to the arc swept by the tire or fender, whichever results in the least clearance. (See figure 6 of this part 1512.)	
1512.18	**Tests and test procedures.**	
(a)	Sharp edge test. [Reserved]	Pass
(b)	[Reserved]	NA
(c)	Protective cap and end-mounted devices test. (Ref. § 1512.4(i), § 1512.6(d).) Any device suitable for exerting a removal force of at least 67 N (15 lbf) for protective caps and 8.9 N (2.0 lbf) for end caps at any point and in any direction may be used. All protective caps and end-mounted handlebar devices shall be tested to determine that they cannot be removed by application of the specified forces.	Pass
(d)	Handbrake loading and performance test: (Ref .§1512. 5(b)).	Pass
(1)	Apparatus. A spring scale or other suitable device for measuring the specified forces on the handbrake levers and a dry, clean, level, paved surface of adequate length.	Pass
(2)	Procedure. The loading test, § 1512.18(d)(2)(i), and the rocking test, § 1512.18(d)(2)(iii), shall be performed before the performance test, § 1512.18(d)(2)(v), is performed and no adjustments shall be made between these tests.	Pass
(i)	Loading test procedure. The hand levers shall be actuated with a force applied at a point no more than 25 mm (1.0 in) from the open end of the lever. If the hand lever contacts the handlebar (bottoms) before a force of 445 N (100 lbf) is reached, the loading may be stopped at that point, otherwise the loading shall be increased to at least 445 N (100 lbf).[4] Application of the loading force shall be repeated for a total of 10 times and all brake components shall be inspected.	Pass
(ii)	Loading test criteria. There shall be no visible fractures, failures, misalignments, and clearances not in compliance with applicable parts of § 1512.5.	Pass
(iii)	Rocking test procedure. A weight of at least 68.1 kg (150 lb) shall be placed on the seat; the force required for the hand levers to contact the handlebars or 445 N (100 lbf), as determined in § 1512.18(d)(2), shall be applied to the hand levers;4 and the bicycle shall be rocked forward and backward over a dry, clean, level, paved surface at least six times and for a distance of at least 76 mm (3 in) in each direction.	Pass
(iv)	Rocking test criteria. There shall be no loosening of the brake pads, pad holders, or cable and hand-lever securing devices or any other functional brake component.	Pass
(v)	Performance test procedure. The following test conditions, unless otherwise specified in this part 1512, shall be followed (A) The bicycle shall be ridden over a dry, clean, smooth paved test course free from protruding aggregate. The test course shall provide a coefficient of friction of less then 1.0 and shall have a slope of less than 1 percent.(B) The wind velocity shall be less than 11 km/h (7 mph). (C) Only the brake system under test shall be actuated.(D) The bicycle shall attain the specified ground speed while the rider is in the normal riding position.(E) The rider shall remain in the normal riding position	Pass

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Add: 1-2F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

TEST REPORT

Applicable Section	Description	Result
	throughout the test. (F) The bicycle must be moving in a straight line at the start of brake application. (G) Corrections for velocity at the initiation of braking may be made. The corrected braking distance shall be computed as follow: S_c = (Vs / Vm)2Sm where: S_c = Corrected braking distance, V_s = Specified test velocity. V_m = Measured test velocity, S_m = Measured braking distance. The test run is invalid if at the commencement of the test, the measured test speed of the bicycle is not less than nor greater than the test speed required by this part 1512 by 1.5 km/h (0.9 mph).(H) Four test runs are required. The stopping distance shall be determined by averaging the results of the four test runs. (I) The stopping distances specified are based on a rider weight of at least 68.1 kg (150 lb) and a maximum rider and weight combination of 91 kg (200 lb). Greater stopping distances are allowable for heavier riders and test equipment weights at the rate of 0.30 m per 4.5 kg (1.0 ft per 10 lb).(J) A test run is invalid if front-wheel lockup occurs.(vi) Performance test criteria. The stopping force applied to the hand lever at a point no closer than 25 mm (1.0 in) from the open end shall not exceed 178 N (40 lbf). Bicycles with an equivalent ground speed in excess of 24 km/h (15 mph) (in its highest gear ratio at a pedal crank rate of 60 revolutions per minute)[3] shall stop from an actual test speed of 24 km/h (15 mph) or greater within a distance of 4.57 m (15 ft); when the equivalent ground speed is less than 24 km/h (15 mph) under the same conditions, the bicycle shall stop from an actual test speed of 16 km/h (10 mph) or greater within a distance of 4.57 m (15 ft).	
(e)	Footbrake force and performance test. (Ref . §1512.5(c)(1)and(2))	Pass
(1)	Apparatus. Suitable devices for exerting and measuring the required forces and a dry, clean, level, paved surface of adequate length.	Pass
(2)	Force test. The braking force shall be measured as the wheel is rotated in a direction of forward motion, and the braking force is measured in a direction tangential to the tire during a steady pull after the wheel completes one-half revolution but before the wheel completes one revolution. The brake shall be capable of producing a linearly proportional brake force for a gradually applied pedal force from 89 N to 310 N (20 to 70 lbf) and shall not be less than 178 N (40 lbf) for an applied pedal force of 310 N (70 lbf). All data points must fall within plus or minus 20 percent of the brake force, based on the measured brake load using the least square method of obtaining the best straight line curve.	Pass
(3)	Performance test. The procedure of § 1512.18(d)(2)(v) shall be followed to test the footbrake performance. The stopping distance shall be less than 4.57 m (15 ft) from an actual test speed of 16 km/h (10 mph). In addition, if the equivalent ground speed of the bicycle is in excess of 24 km/h (15 mph) (in its highest gear ratio at a pedal crank rate of 60 revolutions per minute),3 the stopping distance shall be 4.57 m (15 ft) from an actual test speed of 24 km/h (15 mph) or greater.	Pass
(f)	Sidewalk bicycle footbrake force test. For sidewalk bicycles, the footbrake	Pass

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HUAK TESTING

TEST REPORT

Applicable Section	Description	Result
	force test is the same as for bicycles except; the brake force transmitted to the rear wheel shall continually increase as the pedal force is increased from 44.5 N to 225 N (10 to 50 lbf). The ratio of applied pedal force to braking force shall not be greater than two-to-one.	
(g)	Handlebar stem test.	Pass
(1)	Procedure. The handlebar stem shall be tested for strength by applying a force of 2000 N (450 lbf), in a forward direction, for bicycles, or 1000 N (225 lbf) for sidewalk bicycles, at a point in line with the handlbar attachment point and at an angle of 45° from the stem centerline (See fig. 2).	Pass
(2)	Criteria. No visible fractures shall result from this test.	Pass
(h)	Handlebar test. (Ref . § 1512.6(e))	Pass
(1)	Stem-to-fork clamp test-(i)Procedure. The handlebar and handlebar stem shall be assembled to the bicycle in accordance with the manufacturer's instructions. The handlebar-fork assembly shall be subjected to a torque applied about the axis of the stem, and shall then be disassembled and examined for signs of structural damage including cracking, splitting, stripping of threads, bearing damage, and bulging of the stem and fork structures. The handlebar and handlebar stem components shall be inspected for visible signs of galling, gouging, and scoring not due to normal assembly and disassembly operations. (ii) Criteria. There shall be no visible movement between the stem and fork when a torque of 47 + 3, −0 N-m (35 + 2, −0 ft = lb) for bicycles and 20 + 3, −0 N-m (15 + 2, − 0 ft = lb) for sidewalk bicycles is applied to the handlebar about the stem-to-fork axis. There shall be no visible signs of damage to the stem-to-fork assembly or any component part thereof.	Pass
(2)	Handlebar strength and clamp test -(i) Procedure. The stem shall be in place on the bicycle or in an equivalent test fixture and secured according to manufacturer's instructions. A load shall be applied equally to each handlebar end in a direction to cause the greatest torque about the handlebar-to-stem clamp; deflection shall be measured along the line of applied force.(ii) Criteria. The handlebars shall support a force of no less than 445 N (100 lbf) or absorb no less than 22.6 J (200 in-lb) of energy through a maximum deflection of no more than 76 mm (3.0 in.); the handlebar clamp shall prevent rotational movement of the handlebars relative to the clamp, and there shall be no visible fractures.	Pass
(i)	Pedal slip test. [Reserved]	Pass
(j)	Rim test. (Ref . §§ 1512.10 and 1512.11(c))	Pass
(1)	Procedure. Only one wheel need be tested if the front and rear wheel are of identical construction. The wheel to be tested shall be removed from the bicycle and be supported circumferentially around the tire sidewall. A load of 2000 N (450 lbf) shall be applied to the axle and normal to the plane of the wheel for at least 30 seconds. If the wheel hub is offset, the load shall be applied in the direction of the offset.	Pass
(2)	Criteria. The wheel and tire assembly shall be inspected for compliance with the requirements of § 1512.11(a) and shall be remounted on the bicycle according to the manufacturer's instructions and shall turn freely without	Pass

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Add: 1-2F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

TEST REPORT

Applicable Section	Description	Result
	roughness and shall comply with the requirement of § 1512.11(b).	
(3)	Front hub retention test.(Ref . § 1512.12(c)) (i) Procedures. Front hub locking devices shall be released. When threaded nuts and axles are used, the nuts shall be open at least 360° from a finger tight condition. A separation force of at least 111 N (25 lb) shall be applied to the hub on a line along the slots in the fork ends.(ii) Criteria. The front hub shall not separate from the fork; fenders, mudguards, struts, and brakes shall not be allowed to restrain the separation.	Pass
(k)	Fork and frame test. (Ref . §§ 1512.13 and 1512.14)	Pass
(1)	Fork test.-(i) Procedure. With the fork stem supported in a 76 mm (3.0 in) vee block and secured by the method illustrated in figure 1 of this part 1512, a load shall be applied at the axle attachment in a direction perpendicular to the centerline of the stem and against the direction of the rake. Load and deflection readings shall be recorded and plotted at the point of loading.(ii) Criteria. Energy of at least 39.5 J (350 in-lb) shall be absorbed with a deflection in the direction of the force of no more than 64 mm (21/2 in.).	Pass
(2)	Fork and frame assembly test.(i) Procedure. The fork, or one identical to that tested in accordance with the fork test, § 1512.18(k)(1), shall be replaced on the bicycle in accordance with the manufacturer's instructions; and a load of 890 N (200 lbf), or an energy of at least 39.5 J (350 in-lb), whichever results in the greater force, shall be applied to the fork at the axle attachment point against the direction of the rake in line with the rear wheel axle. The test load shall be counteracted by a force applied at the location of the rear axle during this test. (ii) Criteria. There shall be no visible evidence of fracture and no deformation of frame that significantly limits the steering angle over which the front wheel can be turned.	Pass
(l)	Seat adjustment clamps and load test. (Ref . § 1512.15(c)).	Pass
(1)	Procedure. A force of at least 668 N (150 lbf) shall be applied vertically downward (334 N (75 lbf) for sidewalk bicycles) to a point within 25 mm (1.0 in.) from either the front or rear of the seat, whichever produces the greatest torque on the seat clamp. After removal of this force, a force of 222 N (50 lbf) shall then be applied horizontally (111 N (25 lbf) for sidewalk bicycles) to a point within 25 mm (1.0 in.) from either the front or rear of the seat, whichever produces the greatest torque on the clamp.	Pass
(2)	Criteria. No movement of the seat with respect to the seat post, or of the seat post with respect to the bicycle frame, shall have resulted from application of the forces specified.	Pass
(m)	Reflector mount and alignment test. (Ref . § 1512.16 (c)and(d))	Pass
(1)	Procedure. A force of 89 N (20 lbf) shall be applied to the reflector mount in at least three directions selected as most likely to affect its alignment. At least one of those directions shall be selected to represent a force that would be expected in lifting the bicycle by grasping the reflector.	Pass
(2)	Criteria.	Pass
(i)	During test. The optical axis of the reflector shall remain parallel within 15° to the line or intersection of the ground plane and the center plane of the bicycle defined as a plane containing both wheels and the centerlines of the down	Pass

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TEST REPORT

Applicable Section	Description	Result
	tube and seat mast.	
(ii)	Post test. The optical axis of the reflector shall remain parallel within 5° to the line or intersection of the ground plane and the center plane of the bicycle defined as a plane containing both wheels and the centerlines of the down tube and seat mast.	Pass
(n)	Reflector test (Ref. §1512.16(g))	Pass
(1)	Conditioning. The following conditioning in the order given shall be performed prior to testing for performance.	Pass
(i)	Warp age conditioning. The reflector shall be held in a preheated oven for at least one hour at 50° ±5 °C (122±5.4 °F). A pedal reflector may be conditioned integrally with its pedal.	Pass
(ii)	Mechanical impact conditioning. The reflector shall be mounted faceup in a manner similar to the way in which it is mounted on the bicycle. A 13 mm (1/2 in.) diameter polished steel ball shall be dropped normal to the center of the face of the reflector from a height of 0.76 m (30 in.). The ball may be guided by a tube with holes, but not restricted in free fall. Pedal reflectors are exempt from this impact conditioning.	Pass
(iii)	Moisture conditioning. The reflector shall be submerged in tap water in a suitable container. The container shall be pressurized in 17.2 kN/m2 (2.5 psi) (equivalent to 1.7 m (53/4 ft.)) of water for 15 minutes and then released.	Pass
(2)	Reflector performance test.(i) Arrangements for the reflector performance test shall be as shown in figure 3 and the distance D between the light source and the reflector shall be 30.5 m (100 ft.). The source of illumination shall be a lamp with a 51 mm (2.0 in.) effective diameter and a filament operating at 2,856±10 percent color temperature. The observation point shall be colocated (as close as practicable) with the source of illumination. The reflector shall be mounted with the center of the reflector at the center of rotation and at the same horizontal level as the source of illumination. Photometric measurements shall be made at the observation angles and entrance angles given in tables 1 and 2. (ii) The observation angle is the angle formed by a line from the point of observation to the center of the reflector with a second line from the center of the reflector to the source of illumination. The entrance angle is the angle between the optical axis of the reflector and a line from the center of the reflector to the source of illumination. The entrance angle shall be designated left, right, up, and down in accordance with the position of the source of illumination with respect to the axis of the reflector as viewed from behind the reflector when the plane of the observation angle is vertical and the receiver is above the source.(iii) Photometric measurements shall be made either visually or photoelectrically. With either method, the light reflected to the observation point shall be determined. Also, the illumination on the reflector from the source shall be measured.(iv) For visual measurements a comparison lamp, emitting light similar in spectral quality to the reflector, shall be located adjacent to the reflector (at an angle not to exceed1/2°) and arranged so that the candlepower can be varied from 0.01 to 0.25 to make the intensity duplicate that of the reflector under test. The candlepower of the source of the illumination of the reflector under test shall be known or determined for this test. Means shall be provided to change the intensity of the source of	Pass

TEST REPORT

Applicable Section	Description	Result
	illumination without changing the filament color temperature. The comparison lamp shall be designed to avoid reflection from the source of illumination back in the direction of the observer. It shall be of such size and so diffused that when viewed by the observer (through a 21/2 × reducing monocular), the candlepower can be readily compared and adjusted to that of the reflector. The observer shall have at least 10 minutes of dark adaption before making observations. For photoelectric measurements, the opening to the photocell shall not be more than1/2 inch vertical by 1 inch horizontal.(v) Reflectors that mount on the bicycle in a fixed rotational position with respect to the bicycle, or the bicycle component on which they are mounted (such as pedals or spokes), shall be tested with a single orientation. Reflectors that do not mount on the bicycle in a fixed rotational position with respect to the bicycle shall be rotated about their axis through 360° to find the minimum candlepower per footcandle for each test point. If the measurement falls below the minimum requirement at any test point, the reflector shall be rotated ±5° about its axis from the angle where the minimum occurs, and the maximum candlepower per footcandle within this angle shall be the measured value.(vi) Should uncolored reflections from the front surface interfere with photometric readings at any test point the lowest reading and location within 1° above, below, right, and left of the test point shall meet the minimum requirement for the test point.(vii) A recommended coordinate system for definition of color is the "Internationale de l'Eclairage (CIE 1931)" system. In the coordinate system and when illuminated by the source defined in table 4 of this part 1512, a reflector will be considered to be red if its color falls within the region bounded by the red spectrum locus and the lines y = 0.980−x and y = 0.335; a reflector will be considered to be amber if its color falls within the region bounded by the yellow spectrum locus and the lines y = 0.382, y = 0.790−0.667x, and y = x−0.120.	
(o)	Reflective tire and rim test(Ref. § 1512.16(h)and (i))	Pass
(1)	Apparatus. Arrangements for the reflective intensity measurement shall be as shown in figure 3 of this part 1512. A light projector (having a maximum effective lens diameter of D/500, where D is the distance from the source to the retroreflective surface being measured) capable of projecting light of uniform intensity shall be used to illuminate the sample. The light falling on the sample shall have a color temperature of 2856°K + 10% (equivalent to a tungsten filament lamp operated at a color temperature of 2856°K + 10% having approximately the relative energy distribution given in table 4 of this part 1512). The light reflected from the test surface shall be measured with a photoelectric receiver, the response of which has been corrected for the spectral sensitivity of the average photopic human eye. The dimensions of the active area of the receiver shall be such that no point on the perimeter of the receiver is more than D/100 from its center (where d is the distance from the receiver to the retroreflective surface). Wheels used for the measurement of retroreflective tires or rims shall have all exposed metallic surfaces, including spokes, masked in flat black so that when measured these surfaces indicate no appreciable reflectance. The tire shall be mounted and fully inflated. Distances shall be measured from the plane of the wheel and the center of the hub. For the tests, the distance D between the projector and the center of the	Pass

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TEST REPORT

Applicable Section	Description	Result
	wheel and distance d between the center of the wheel and the receiver shall each be at least 15 m (50 ft.).	
(2)	Procedure	Pass
(i)	Masking. The reflecting strip to be tested shall be within two concentric circles, the larger of which is no more than 0.02 m (0.79 in.) greater in radius than the smaller. While additional reflecting material is permitted outside such boundaries, such additional material shall not be counted in determining the average width of the reflecting strip and shall be masked off with opaque, matte black tape in testing the reflecting material.	Pass
(ii)	Orientation. Every position of the reflecting strip on the rim or the mounted and fully inflated tire to be tested shall be oriented so that the normal to this portion is within 40° of parallel to the axis of rotation of the wheel.	Pass
(iii)	Measurement. Measure the distance d from the receiver to the center of the wheel and the minimum distance r from the axis of rotation of the wheel to the unmasked portion of the reflective strip. Measure the illumination incident on the reflective strip at uniform intervals of no more than 45° around the wheel, with the receiver oriented in the direction of the incident radiation. The average of such readings will be the mean illumination of the sample E. If any one of such readings differs by more than 10 percent from the mean illumination, then a more uniform source must be obtained. Measure the illumination of the receiver due to reflection from the retroreflective surface for each entrance angle and each observation angle given in table 3 of this part 1512. The entrance angle and the observation angle shall be in the same plane. A negative entrance angle (figure 3 of this part 1512) is specified when the entrance angle is small because the location of the receiver with respect to the direction of illumination becomes important for distinguishing between ordinary mirror-like reflection and retroreflection. The illumination incident on the test surface and the receiver shall be measured in the same units on a linear scale. Compute the ratio A for each combination of entrance angle and observation angle listed in table 3 as follows: A = [(Er / Es)(d2 / r)] Where: A = Ratio in meters, Er = Illumination incident upon the receiver, Es = Illumination incident upon a plane perpendicular to the incident ray at the specimen position (see instructions above in this paragraph (o)(2)(iii) for averaging), measured in the same units as Er, d = The distance in meters from the receiver to the center of the wheel, r = The minimum radius in meters of the boundary circles of the retroreflective strip. The minimum value of A shall be that listed in table 3 of this part 1512 for each combination of entrance angle and observation angle. The plane containing the entrance angle and the plane containing the observation angle shall coincide. In table 3, a positive entrance angle corresponds to the case in which the line of sight to the receiver lies between the line of incidence and the optic axis of the reflector, and a negative entrance angle corresponds to the case in which the line of incidence lies between the line of sight of the receiver and optic axis of the reflector.	Pass

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TEST REPORT

Applicable Section	Description	Result
(iv)	Criteria. The ratio A as defined in § 1512.18(o)(2)(iii) shall not be less than: $A = 4\text{Cos}2\theta/[1 + (\Phi/0.225)3/2]$ where A is ratio in meters, θ is the entrance angle in degrees, and Φ is the observation angle in degrees. The criterion applies only for entrance angles from 0° to 40° and observation angles from 0.2° to 1.5°, and performance is not specified beyond this range. The values of A in table 3 are obtained from the above formula by rounding up to two significant figures. Except in cases in which the performance of the reflector is seriously questionable, a reflector with A at least the value given in table 3 at each of the six combinations of entrance and observation angles will be considered to satisfy this criteria.	Pass
(b)	A bicycle less than fully assembled and fully. adjusted shall have clearly displayed on any promotional display material and on the outside surface of the shipping carton the following: (1) A list of tools necessary to properly accomplish assembly and adjustment, (2) a drawing illustrating the minimum leg-length dimension of a rider and a method of measurement of this dimension.	Pass
(p)	Road test.(1) Procedure. The bicycle shall be ridden at least 6.4 km (4.0 mi.) by a rider weighing at least 68.1 kg (150 lb.) with the tires inflated to maximum recommended pressure. Travel shall include riding the bicycle five times over a 30 m (100 ft.) course of wooden cleats fastened to a paved surface. The cleats shall be a full 25 mm (1.0 in.) high by 51 mm (2.0 in.) wide lumber with a 12 mm by 12 mm (1/2 in. by1/2 in.) chamfer of 45° on the corners contacting the tires. The cleats shall be spaced every 1.8 m (6.0 ft.) over the 30 m (100 ft.) course. The bicycle shall be ridden over the cleated course at a speed of at least 24 km/hr (15 mph) with the rider firmly seated.(2) Criteria. The bicycle shall exhibit stable handling, turning, and steering characteristics without difficulty of operation. There shall be no system or component failure of the structure, brakes, or tires and there shall be no loosening or misalignment of the seat, handlebars, controls, or reflectors.	Pass
q	Sidewalk bicycle proof test. (Ref. §§ 1512.15(c) and 1512.17(b)):	Pass
(1)	Procedure. The bicycle shall be loaded with weights of 13.6 kg (30 lb.) on the seat surface and 4.5 kg (10 lb.) attached to the end of each handle grip for a total load of 22.7 kg (50 lb.). The bicycle shall be lifted a distance of 0.3 m (1.0 ft.) and dropped (while maintaining an upright position) three times onto a paved surface. Following this and with weight removed, it shall be allowed to fall in any configuration and attitude from an upright position to the paved surface three times on each side.	Pass
(r)	Abrasion test for retroreflective rims.	Pass
(1)	This test consists of a steel wire cup brush rotating at a constant velocity of 60 rpm that is applied at a force of 2 N (0.45 lbf) to the retroreflective material on one side of a bicycle wheel rim. The rim is rotated about the axle at a linear velocity of 0.23 m/sec (9 in./sec). The test is complete when the wheel has completed 1000 revolutions.	Pass
(2)	Apparatus. Figure 8 of this part 1512 illustrates the following test fixture arrangement that is suitable to perform this abrasion test (i) Test fixture. The test fixture contains a clamp to hold the axle of a bicycle wheel so that the wheel can rotate freely about the axle. The axis of rotation is capable of being inclined from the vertical to bring that portion of the side of the wheel rim	Pass

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TEST REPORT

Applicable Section	Description	Result
	containing the retroreflective material into a horizontal plane as it passes beneath the abrading brush. A drive mechanism to rotate the bicycle wheel contains a means to adjust the rotational velocity to obtain the specified linear velocity measured at a point on the wheel rim on the axis of the abrading brush. (ii) Abrader. The abrader is a cup brush meeting the specification in paragraph (r)(3)(v) of this section. It is mounted in a chuck attached to a motor that rotates about a vertical axis at the specified rotational velocity. A means is provided to apply the rotating cup brush at the specified force against the retroreflective material on the bicycle wheel rim. The axis of the abrading brush is positioned on the midpoint in the width of the retroreflective material. The force is produced by deadweights applied to a pan on the axis of the counterbalanced motor/brush assembly.	
(3)	Specifications.	Pass
(i)	The linear velocity of the reflective band on wheel rim shall be 0.23 m/sec (9 in./sec) measured at a point on the axis of the abrading brush.	Pass
(ii)	The rotational velocity of the abrading brush shall be 60 rpm.	Pass
(iii)	The force normal to the plane of the retroreflective material at which the abrading brush is to be applied shall be 2 N (0.45 lbf).	Pass
(iv)	The bicycle wheel shall make 1000 complete revolutions per test.	Pass
(v)	The abrader shall be a cup brush having bristles that are 0.005 in. (approx. 0.13mm) diameter low carbon steel wire; an outside diameter of 0.5 inch (aprox. .13mm); a wire bristle length of 0.25 inch (approx. 6.4mm); and a cup diameter of 0.405 inch (approx. 10.29mm)	Pass
(vi)	The abrasion test shall be conducted at an ambient temperature of between 16 °C (60 °F) and 27 °C (80 °F).	Pass
(4)	Procedure. (i)The retroreflective bicycle rim to be tested shall be an unused sample free from grit, grime and grease. Prior to beginning the test, remove, according to instructions supplied with the bicycle, any protective coating or material used to prevent damage in shipping.(ii) Test the wheel in a suitable test fixture, according to the specifications in paragraph (r)(3) of this section.(iii) Clamp the wheel by its axle in the test fixture and align the axis of rotation so that the portion of the reflective material below the axis of the abrading brush is horizontal.(iv) Shape the cup brush by hand to the specified 0.5 (approx. 13mm) diameter. Any stray wire bristles projecting more than1/32 in. (approx. 1 mm) beyond the tip of the bulk of the bristles should be clipped off. Adjust the position of the brush so that its axis is centered over the mid-point in the width of the retroreflective material.(v) Adjust the rotational velocity of the bicycle wheel to obtain a linear velocity of 0.23 m/sec (9 in./sec) measured at the mid-point in the width of the retroreflective material. Adjust the force to obtain a force normal to the surface under the brush of 2 N (0.45 lbf).(vi) Apply the abrading brush to the retroreflective material on the wheel rim, and continue the test for 1000 complete revolutions of the bicycle wheel.	Pass
1512.19	**Instructions and labeling.** A bicycle shall have an instruction manual attached to its frame or included with the packaged unit.	
(a)	The instruction manual shall include at least the following:	Pass

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HUAK TESTING

TEST REPORT

Applicable Section	Description	Result
	(1) Operations and safety instructions describing operation of the brakes and gears, cautions concerning wet weather and night-time operation, and a guide for safe on-and-off road operation.(2) Assembly instructions for accomplishing complete and proper assembly.(3) Maintenance instructions for proper maintenance of brakes, control cables, bearing adjustments, wheel adjustments, lubrication, reflectors, tires and handlebar and seat adjustments; should the manufacturer determine that such maintenance is beyond the capability of the consumer, specifics regarding locations where such maintenance service can be obtained shall be included.	
(b)	A bicycle less than fully assembled and fully adjusted shall have clearly displayed on any promotional display material and on the outside surface of the shipping carton the following(1) A list of tools necessary to properly accomplish assembly and adjustment,(2) a drawing illustrating the minimum leg-length dimension of a rider and a method of measurement of this dimension.	Pass
(c)	The minimum leg-length dimension shall be readily understandable and shall be based on allowing no less than one inch of clearance between (1)the top tube of the bicycle and the ground plane and (2) the crotch measurement of the rider. A girl's style frame shall be specified in the same way using a corresponding boys' model as a basis.	Pass
(d)	(Reserved]	NA
(e)	Every bicycle subject to the requirements of this part 1512 shall bear a marking or label that is securely affixed on or to the frame of the bicycle in such a manner that the marking or label cannot be removed without being defaced or destroyed. The marking or label shall identify the name of the manufacturer or private l a bear and shall also bear some form of marking from which the manufacturer can identify the month and year of manufacture or from which the private labeler can identify the manufacturer and the month and year of manufacture. For purposes of this paragraph, the term manufacture means the completion by the manufacturer of a bicycle of those construction or assembly operations that are performed by the manufacturer before the bicycle is shipped from the manufacturer's place of production for sale to distributors, retailers, or consumers.	Pass
1512.20	**Separability.**	Pass

--NA= Not Applicable

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HUAK TESTING

TEST REPORT

Tested part(s):

Seq. no	Part(s) name	Sample description
1	Black rubber	tyre
2	White plastic	headlight
3	Black plastic	cannula
4	Black rubber	Haft
5	Black leather	cushion
6	Red coating (Silver metal)	brake
7	Black plastic	Key
8	White, red print (White sticker)	Warning sign
9	White, red print (White sticker)	Warning sign
10	Black rubber(R)	Side light

(R)=Re-submitted sample.

C. USA 16 CFR Part 1303 Ban of Lead Containing Paint and Certain Consumer Products Bearing Lead- Containing Paint

Test method: Lead in paint and other similar surface coatings: With reference to CPSC-CH-E1003-09 1, sample was digested with acid mixture and analyzed by inductively coupled plasma atomic emission spectrometer (ICP-AES)

Item	Unit	MDL	Results			Limit
			6	8	9	
Lead Content (Pb)	mg/kg	5	N.D.	N.D.	N.D.	90
Conclusion	/	/	**Pass**	**Pass**	**Pass**	/

D. USA Consumer Product Safety Improvement Act (CPSIA) Sec.101 Children´s products containing Lead; Lead paint rule

(1) Substrate Materials

Test method: With reference toCPSC-CH-E1001-08.3; CPSC-CH-E1002-08.3, by acid digestion and analysis was performed by inductively coupled plasma atomic emission spectrometer (ICP-AES).

Item	Unit	MDL	Results				Limit
			1	2	3	4	
Lead Content (Pb)	mg/kg	5	N.D.	N.D.	N.D.	N.D.	100
Conclusion	/	/	**Pass**	**Pass**	**Pass**	**Pass**	/

Item	Unit	MDL	Results				Limit
			5	6	7	8	
Lead Content (Pb)	mg/kg	5	N.D.	N.D.	N.D.	N.D.	100
Conclusion	/	/	**Pass**	**Pass**	**Pass**	**Pass**	/

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HUAK TESTING

TEST REPORT

Item	Unit	MDL	Results				Limit
			9	10	/	/	
Lead Content (Pb)	mg/kg	5	N.D.	N.D.	/	/	100
Conclusion	/	/	**Pass**	**Pass**	/	/	/

(2) Paint and similar surface coating material

Test method: Lead in paint and other similar surface coatings: With reference to CPSC-CH-E1003-09.1, sample was digested with acid mixture and analyzed by inductively coupled plasma atomic emission spectrometer (ICP-AES)

Item	Unit	MDL	Results			Limit
			6	8	9	
Lead Content (Pb)	mg/kg	5	N.D.	N.D.	N.D.	90
Conclusion	/	/	**Pass**	**Pass**	**Pass**	/

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E. USA Consumer Product Safety Improvement Act (CPSIA) Sec.108 Prohibition on sale of certain products containing specified phthalates

USA 16 CFR Part 1307 Prohibition of Children's Toys and Child Care Articles Containing Specified Phthalates

Test method: With reference to CPSC-CH-C1001-09.4, by sol vent extraction and analysis was performed by gas chromatographic-mass spectrometer (GC-MS).

Item	Unit	MDL	Results			Limit
			1	2	3	
Dibutyl Phthalate (DBP)	mg/kg	30	N.D.	N.D.	N.D.	1000
Benzylbutyl Phthalate (BBP)	mg/kg	30	N.D.	N.D.	N.D.	1000
Bis-(2-ethylhexyl) Phthalate(DEHP)	mg/kg	30	N.D.	N.D.	N.D.	1000
Diisononyl Phthalate (DINP)	mg/kg	100	N.D.	N.D.	N.D.	1000
Di-isobutyl Phthalate (DIBP)	mg/kg	100	N.D.	N.D.	N.D.	1000
Dicyclohexyl Phthalate (DCHP)	mg/kg	100	N.D.	N.D.	N.D.	1000
Di-n-hexyl Phthalate (DHEXP)	mg/kg	100	N.D.	N.D.	N.D.	1000
Di-n-pentyl Phthalates (DPENP)	mg/kg	100	N.D.	N.D.	N.D.	1000
Conclusion	/	/	**Pass**	**Pass**	**Pass**	/

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HUAK TESTING

TEST REPORT

Item	Unit	MDL	Results			Limit
			4	5	7	
Dibutyl Phthalate (DBP)	mg/kg	30	N.D.	N.D.	N.D.	1000
Benzylbutyl Phthalate (BBP)	mg/kg	30	N.D.	N.D.	N.D.	1000
Bis-(2-ethylhexyl) Phthalate(DEHP)	mg/kg	30	N.D.	N.D.	N.D.	1000
Diisononyl Phthalate (DINP)	mg/kg	100	N.D.	N.D.	N.D.	1000
Di-isobutyl Phthalate (DIBP)	mg/kg	100	N.D.	N.D.	N.D.	1000
Dicyclohexyl Phthalate (DCHP)	mg/kg	100	N.D.	N.D.	N.D.	1000
Di-n-hexyl Phthalate (DHEXP)	mg/kg	100	N.D.	N.D.	N.D.	1000
Di-n-pentyl Phthalates (DPENP)	mg/kg	100	N.D.	N.D.	N.D.	1000
Conclusion	/	/	**Pass**	**Pass**	**Pass**	/

Item	Unit	MDL	Results			Limit
			8	9	10	
Dibutyl Phthalate (DBP)	mg/kg	30	N.D.	N.D.	N.D.	1000
Benzylbutyl Phthalate (BBP)	mg/kg	30	N.D.	N.D.	N.D.	1000
Bis-(2-ethylhexyl) Phthalate(DEHP)	mg/kg	30	N.D.	N.D.	712	1000
Diisononyl Phthalate (DINP)	mg/kg	100	N.D.	N.D.	N.D.	1000
Di-isobutyl Phthalate (DIBP)	mg/kg	100	N.D.	N.D.	N.D.	1000
Dicyclohexyl Phthalate (DCHP)	mg/kg	100	N.D.	N.D.	N.D.	1000
Di-n-hexyl Phthalate (DHEXP)	mg/kg	100	N.D.	N.D.	N.D.	1000
Di-n-pentyl Phthalates (DPENP)	mg/kg	100	N.D.	N.D.	N.D.	1000
Conclusion	/	/	**Pass**	**Pass**	**Pass**	/

Note:

- N.D. =Not Detected or less than MDL.
- MDL=Method Detection Limit.
- NA= Not Applicable
- %=Percentage by weight.
- 0.1%=1000mg/kg, mg/kg=ppm.
- The selection of test portions is strongly recommended by the client and the conclusion of chemical test is only for the selected portion.

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TEST REPORT

F. CPSA Section 14(a) (5) Tracking Labels for Children's Products (15 USC §2063(a)(5) (CPSA))

Applicable Section	Description	Result
(a)(5) (A)	Effective 1 year after the date of enactment of the Consumer Product Safety Improvement Act of 2008, the manufacturer of a children's product shall place permanent, distinguishing marks on the product and its packaging, to the extent practicable, that will enable—	Pass
(i)	the manufacturer to ascertain the location and date of production of the product, cohort information (including the batch, run number, or other identifying characteristic), and any other information determined by the manufacturer to facilitate ascertaining the specific source of the product by reference to those marks; and	Pass
(ii)	the ultimate purchaser to ascertain the manufacturer or private labeler, location and date of production of the product, and cohort information (including the batch, run number, or other identifying characteristic).	Pass
(B)	The Commission may, by regulation, exclude a specific product or class of products from the requirements in subparagraph (A) if the Commission determines that it is not practicable for such product or class of products to bear the marks required by such subparagraph. The Commission may establish alternative requirements for any product or class of products excluded under the preceding sentence consistent with the purposes described in clauses (i) and (ii) of subparagraph (A).	NA
(b)	The Commission may by rule prescribe reasonable testing programs for any product which is subject to a consumer product safety rule under this Act, or a similar rule, regulation, standard, or ban under any other Act enforced by the Commission, and for which a certificate is required under subsection (a). Any test or testing program on the basis of which a certificate is issued under subsection (a) may, at the option of the person required to certify the product, be conducted by an independent third party qualified to perform such tests, unless the Commission, by rule, requires testing by an independent third party for a particular rule, regulation, standard, or ban, or for a particular class of products.	Pass
(c)	The Commission may by rule require the use and prescribe the form and content of labels which contain the following information (or that portion of it specified in the rule) —	Pass
(1)	The date and place of manufacture of any consumer product.	Pass
(2)	The cohort information (including the batch, run number, or other identifying characteristic) of the product.	Pass
(3)	A suitable identification of the manufacturer of the consumer product, unless the product bears a private label in which case it shall identify the private labeler and shall also contain a code mark which will permit the seller of such product to identify the manufacturer thereof to the purchaser upon his request.	Pass
(4)	In the case of a consumer product subject to a consumer product safety rule, a certification that the product meets all applicable consumer product safety standards and a specification of the standards which are applicable. Such labels, where practicable, may be required by the Commission to be permanently marked on or affixed to any such consumer product. The Commission may, in appropriate cases, permit information required under	Pass

HUAK TESTING

TEST REPORT

Applicable Section	Description	Result
	paragraphs (1) and (2) of this subsection to be coded.	
(d)	REQUIREMENT FOR ADVERTISEMENTS.—No advertisement for a consumer product or label or packaging of such product may contain a reference to a consumer product safety rule or a voluntary consumer product safety standard unless such product conforms with the applicable safety requirements of such rule or standard.	Pass
(e)	WITHDRAWAL OF ACCREDITATION-	Pass
(f)	DEFINITIONS.--In this section	Pass
(g)	REQUIREMENTS FOR CERTIFICATES.-- (1) IDENTIFICATION OF ISSUER AND CONFORMITY ASSESSMENT BODY.--Every certificate required under this section shall identify the manufacturer or private labeler issuing the certificate and any third party conformity assessment body on whose testing the certificate depends. The certificate shall include, at a minimum, the date and place of manufacture, the date and place where the product was tested, each party's name, full mailing address, telephone number, and contact information for the individual responsible for maintaining records of test results.	Pass
(h)	RULE OF CONSTRUCTION.	Pass
(i)	ADDITIONAL REGULATIONS FOR THIRD PARTY TESTING	Pass

****

**** Modified History ****

Revision	Description	Issued Data	Remark
Revision 1.0	Initial Test Report Release	2024/03/04	Jason Zhou

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HUAK TESTING

TEST REPORT

Photograph of Sample

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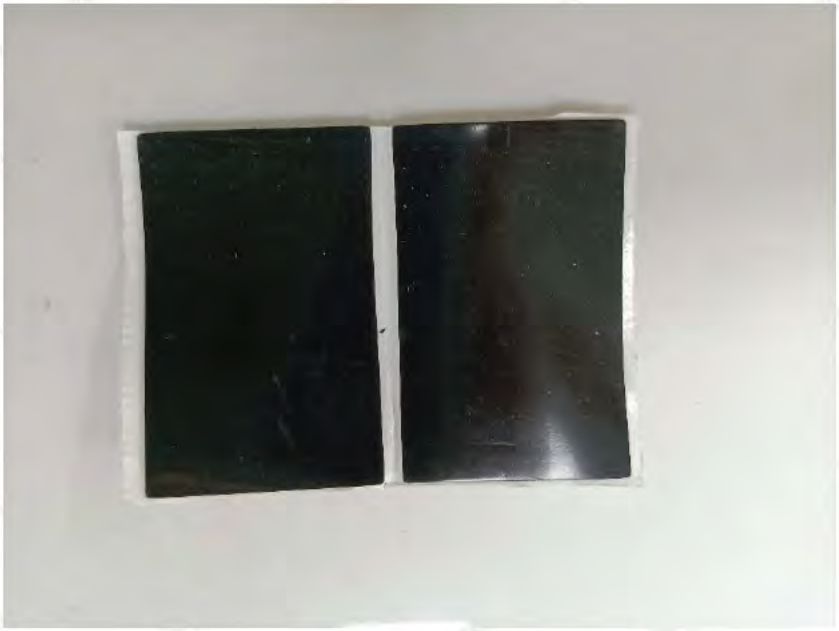

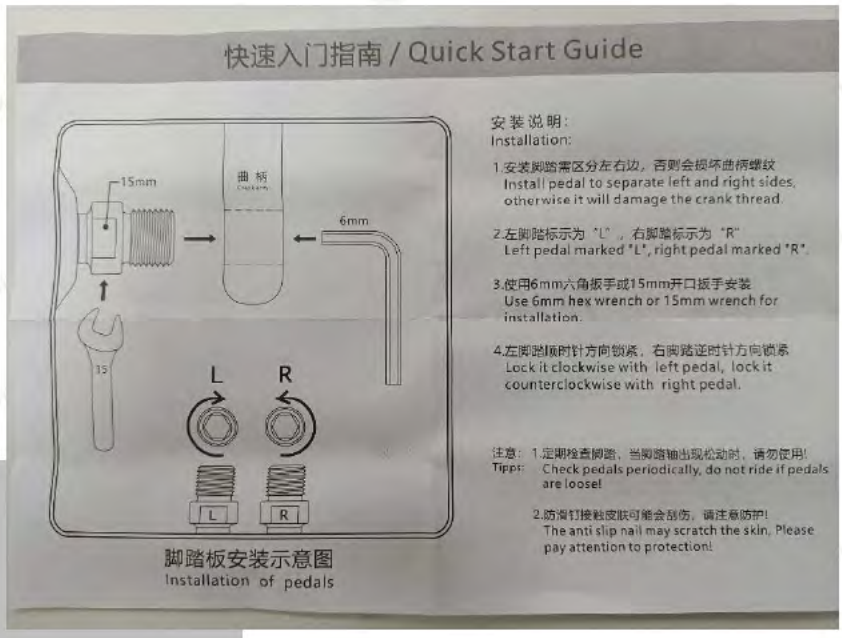

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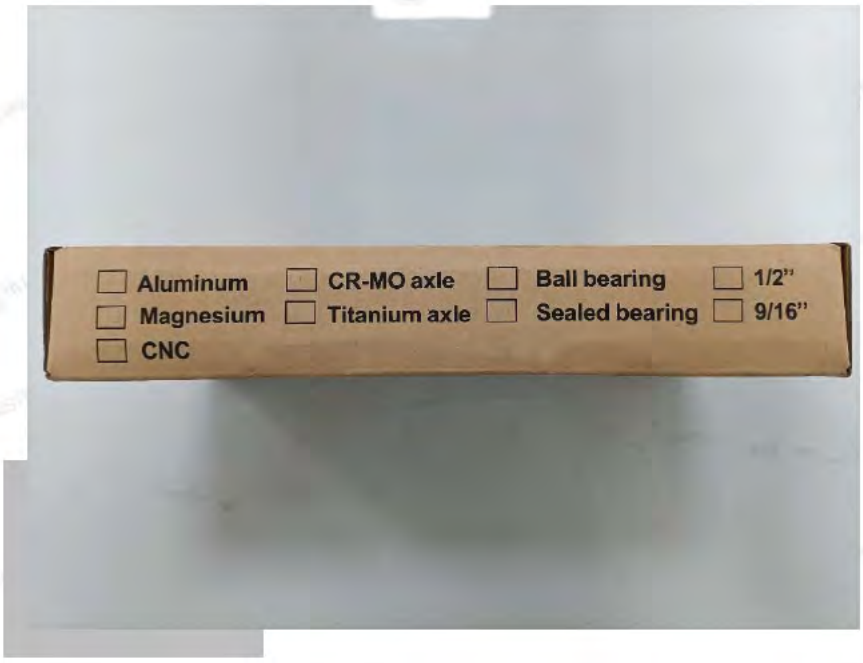

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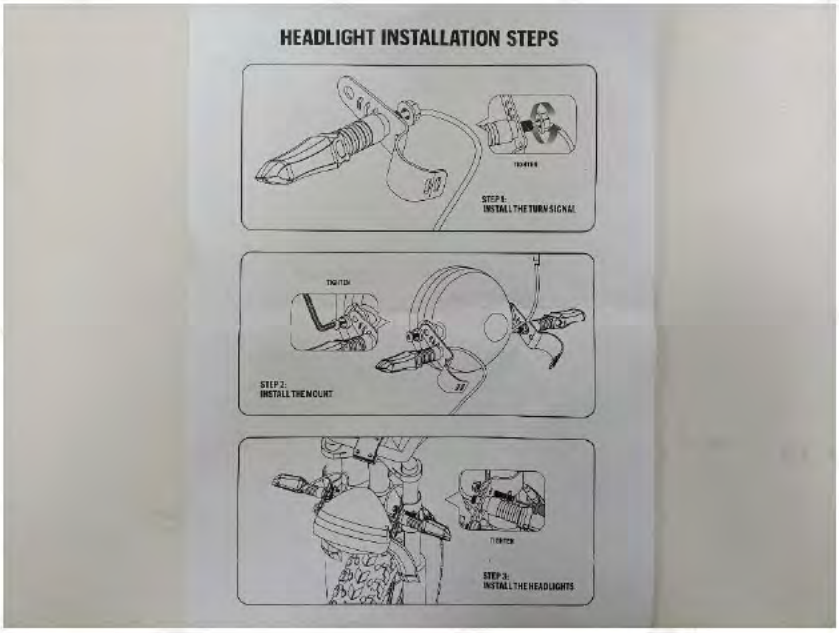

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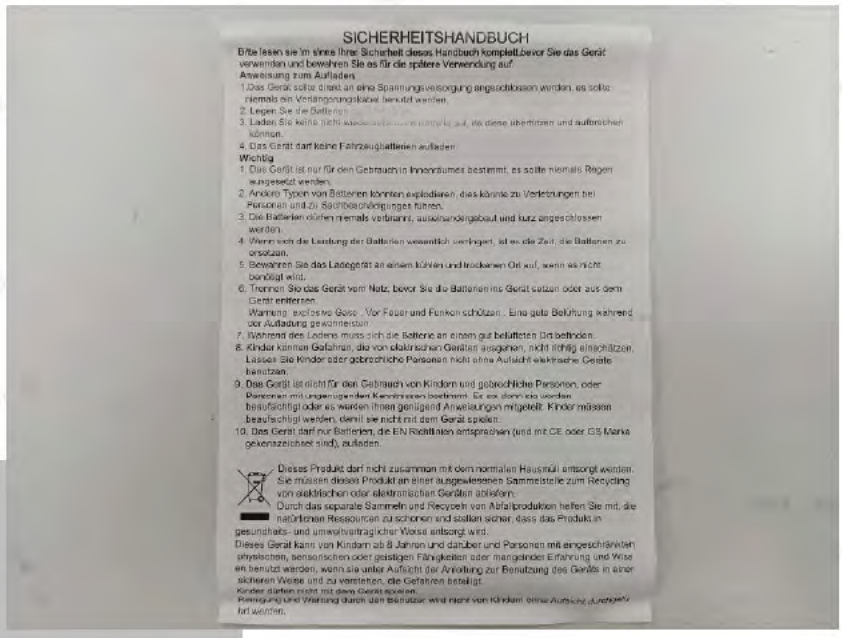

SICHERHEITSHANDBUCH

Bitte lesen sie im sinne Ihrer Sicherheit dieses Handbuch komplett,bevor Sie das Gerät verwenden und bewahren Sie es für die spätere Verwendung auf.

Anweisung zum Aufladen

1.Das Gerät sollte direkt an eine Spannungsversorgung angeschlossen werden, es sollte niemals ein Verlängerungskabel benutzt werden.

2. Legen Sie die Batterien

3. Laden Sie keine nicht-wiederaufladbare Batterie auf, da diese überhitzen und aufbrechen können.

4. Das Gerät darf keine Fahrzeugbatterien aufladen.

Wichtig

1. Das Gerät ist nur für den Gebrauch in Innenräumen bestimmt, es sollte niemals Regen ausgesetzt werden.

2. Andere Typen von Batterien könnten explodieren, dies könnte zu Verletzungen bei Personen und zu Sachbeschädigungen führen.

3. Die Batterien dürfen niemals verbrannt, auseinandergebaut und kurz angeschlossen werden.

4. Wenn sich die Ladung der Batterien wesentlich verringert, ist es die Zeit, die Batterien zu ersetzen.

5. Bewahren Sie das Ladegerät an einem kühlen und trockenen Ort auf, wenn es nicht benötigt wird.

6. Trennen Sie das Gerät vom Netz, bevor Sie die Batterien ins Gerät setzen oder aus dem Gerät entfernen.

Warnung: explosive Gase . Vor Feuer und Funken schützen . Eine gute Belüftung während der Aufladung gewährleisten

7. Während des Ladens muss sich die Batterie an einem gut belüfteten Ort befinden.

8. Kinder können Gefahren, die von elektrischen Geräten ausgehen, nicht richtig einschätzen. Lassen Sie Kinder oder gebrechliche Personen nicht ohne Aufsicht elektrische Geräte benutzen.

9. Das Gerät ist nicht für den Gebrauch von Kindern und gebrechliche Personen, oder Personen mit ungenügenden Kenntnissen bestimmt. Es sei denn sie werden beaufsichtigt oder es werden ihnen genügend Anweisungen mitgeteilt. Kinder müssen beaufsichtigt werden, damit sie nicht mit dem Gerät spielen.

10. Das Gerät darf nur Batterien, die EN Richtlinien entsprechen (und mit CE oder GS Marke gekennzeichnet sind), aufladen.

Dieses Produkt darf nicht zusammen mit dem normalen Hausmüll entsorgt werden. Sie müssen dieses Produkt an einer ausgewiesenen Sammelstelle zum Recycling von elektrischen oder elektronischen Geräten abliefern.

Durch das separate Sammeln und Recyceln von Abfallprodukten helfen Sie mit, die natürlichen Ressourcen zu schonen und stellen sicher, dass das Produkt in gesundheits- und umweltverträglicher Weise entsorgt wird.

Dieses Gerät kann von Kindern ab 8 Jahren und darüber und Personen mit eingeschränkten physischen, sensorischen oder geistigen Fähigkeiten oder mangelnder Erfahrung und Wissen benutzt werden, wenn sie unter Aufsicht der Anleitung zur Benutzung des Geräts in einer sicheren Weise und zu verstehen, die Gefahren beteiligt.

Kinder dürfen nicht mit dem Gerät spielen.

Reinigung und Wartung durch den Benutzer wird nicht von Kindern ohne Aufsicht durchgeführt werden.

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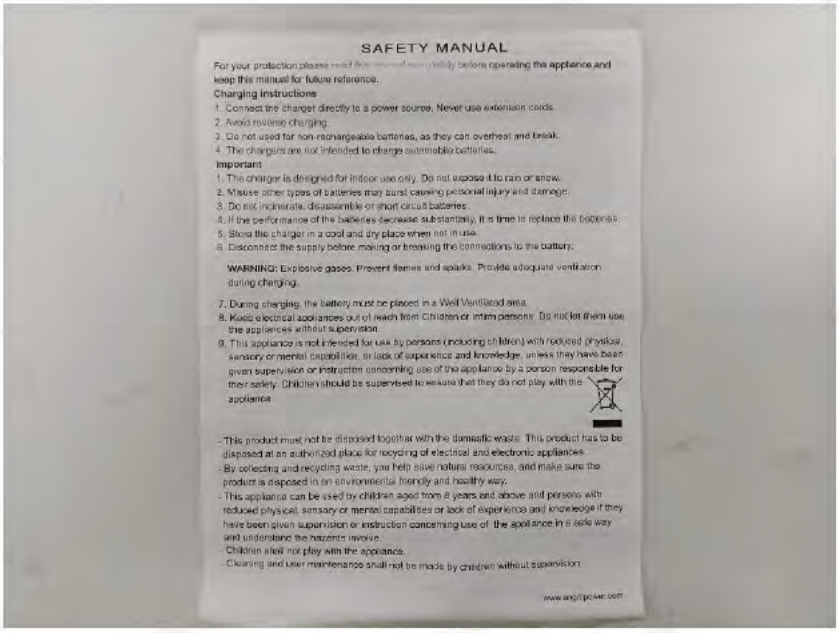

SAFETY MANUAL

For your protection please read these manual carefully before operating the appliance and keep this manual for future reference.

Charging instructions

1. Connect the charger directly to a power source. Never use extension cords.
2. Avoid reverse charging.
3. Do not used for non-rechargeable batteries, as they can overheat and break.
4. The chargers are not intended to charge automobile batteries.

Important

1. The charger is designed for indoor use only. Do not expose it to rain or snow.
2. Misuse other types of batteries may burst causing personal injury and damage.
3. Do not incinerate, disassemble or short circuit batteries.
4. If the performance of the batteries decrease substantially, it is time to replace the batteries.
5. Store the charger in a cool and dry place when not in use.
6. Disconnect the supply before making or breaking the connections to the battery.

WARNING: Explosive gases. Prevent flames and sparks. Provide adequate ventilation during charging.

7. During charging, the battery must be placed in a Well Ventilated area.
8. Keep electrical appliances out of reach from Children or infirm persons. Do not let them use the appliances without supervision.
9. This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.

- This product must not be disposed together with the domestic waste. This product has to be disposed at an authorized place for recycling of electrical and electronic appliances.
- By collecting and recycling waste, you help save natural resources, and make sure the product is disposed in an environmental friendly and healthy way.
- This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involve.
- Children shall not play with the appliance.
- Cleaning and user maintenance shall not be made by children without supervision.

www.angltpower.com

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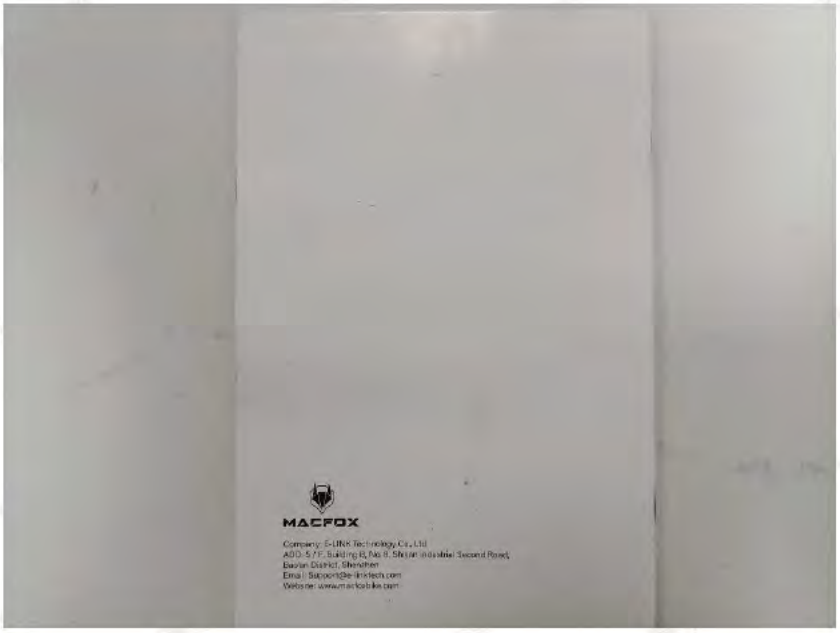

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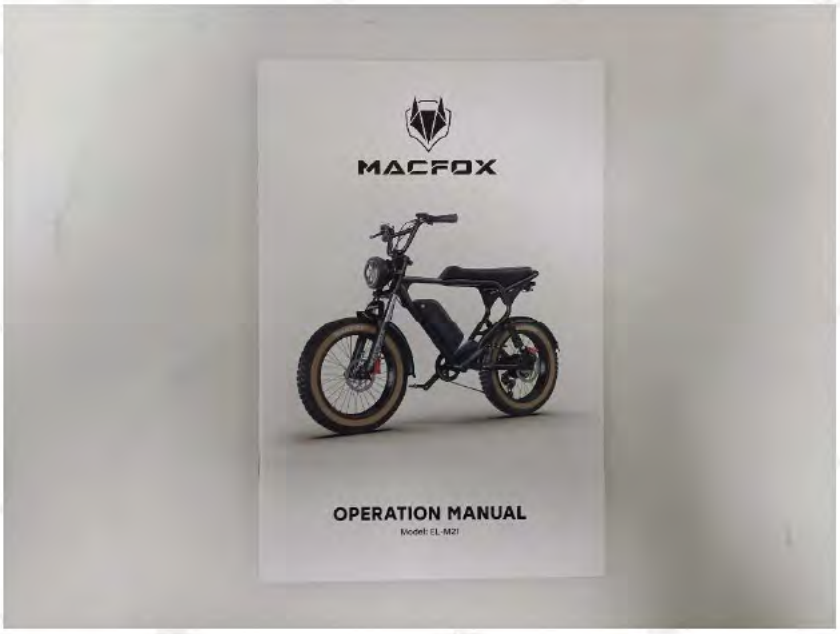

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HUAK TESTING

TEST REPORT

Product Name: **Electric bicycle**

Brand: MACFOX

Model NO.: EL-M21

Recommended age: 16+

Date of manufacture: 2024.2

Batch NO.:

Inspector:

Manufacturer: E-Link Technology Co., Ltd

Add: 4-5 Floor, BL.B Tongwei Optoelectronics Factory Area, No.8, Gongye 2nd Road, Shilong, Shiyan Street 518108, Bao'an district, Shenzhen

MADE IN CHINA

⚠WARNING:

Only allowed for adults to install, Keep children away.

To be used under the direct supervision of an adult.

Helmets must be worn when riding.

Before riding, the bicycle should be inspected to ensure safety.

Brakes, tires, air pressure, and handlebars should be inspected regularly.

HUAK authenticate the photo on original report only

***** End of Report *****

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TEST REPORT
UL 2849
STANDARD FOR SAFETY
Electrical Systems for eBikes

Report Number..... :	HK2306160767-SR
Date of issue..... :	2023-06-21
Total number of pages..... :	48
Testing Laboratory .....:	Shenzhen HUAK Testing Technology Co., Ltd.
Address.....:	1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
Applicant's name.....:	E-Link Technology Co., Ltd.
Address.....:	4-5 Floor, BL.B Tongwei Optoelectronics Factory Area, No.8, Gongye 2nd Road, Shilong, Shiyan Street 518108, Bao'an district, Shenzhen, China
Test specification:	
Standard .....:	UL 2849:2020
Test procedure .....:	UL test report
Non-standard test method.....:	N/A
Test Report Form No.....:	UL 2849_A
TRF originated by.....:	HUAK
General disclaimer: The test results presented in this report relate only to the object tested.	
Test item description .....:	Electric bicycle
Trade Mark.....:	N/A
Manufacturer.....:	E-Link Technology Co., Ltd.
Address .....:	4-5 Floor, BL.B Tongwei Optoelectronics Factory Area, No.8, Gongye 2nd Road, Shilong, Shiyan Street 518108, Bao'an district, Shenzhen, China
Model/Type reference.....:	EL-M21
Ratings.....:	54.6VDC, 3.0A

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Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
☒	**Testing Laboratory:**	Shenzhen HUAK Testing Technology Co., Ltd.
Testing location/ address .....:		1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
☒	**Associated Testing Laboratory:**	
Testing location/ address .....:		
Tested by (name, function, signature).....:		s47F
Approved by (name, function, signature) ..:		s47F
☐	**Testing procedure: TMP/CTF Stage 1:**	
Testing location/ address .....:		
Tested by (name, function, signature).....:		
Approved by (name, function, signature) ..:		
☐	**Testing procedure: WMT/CTF Stage 2:**	
Testing location/ address .....:		
Tested by (name + signature).....:		
Witnessed by (name, function, signature) .:		
Approved by (name, function, signature) ..:		
☐	**Testing procedure: SMT/CTF Stage 3 or 4:**	
Testing location/ address .....:		
Tested by (name, function, signature).....:		
Witnessed by (name, function, signature) .:		
Approved by (name, function, signature) ..:		
Supervised by (name, function, signature) :		

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Add: 1-2F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

Copy of marking plate:

Electric bicycle
Model: EL-M21
Input: 54.6VDC, 3.0A
E-Link Technology Co., Ltd.
Made in China

Possible test case verdicts:

- test case does not apply to the test object..... : N/A (or N)
- test object does meet the requirement..... : P (Pass)
- test object does not meet the requirement ..... : F (Fail)
- test date..... : From Jun. 15, 2023 to Jun. 21, 2023

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UL 2849			
Clause	Requirement – Test	Result – Remark	Verdict
7	General		P
7.1	The information provided in Sections 7 through 10 is essential for the proper evaluation of the products covered by this Standard. The concepts in these Sections will outline and define the evaluation path based on what is provided in the electrical system.		P
7.2	The concepts in Sections 7 through 10 are general in nature and could result in different methods of evaluation for each different product type dependent upon its overall design.		P
7.3	EBikes consist of both EPAC and non-EPAC types, but in all cases functional pedals shall be provided. For EPACs, motors shall disengage their assist function when the rider stops pedaling, when a maximum predetermined speed as specified by the manufacturer is reached, or when the user applies the brakes (if the brakes are provided with cutoff functions). For non-EPAC versions of the eBike, motors are not required to disengage when the user stops pedaling. A non-EPAC type eBike may be provided with an EPAC mode.		P
7.4	The electrical system located on the eBike, those subassemblies or components shall comply with all the requirements in this Standard at a maximum altitude of 2000 m (6562 feet) and over an ambient temperature range of 0°C to 40°C (32°F to 104°F) and be subjected to ingress protection tests. Equipment may be used at ambient temperature extremes for operation and battery charging that exceed the default limits above (e. g., -10 ° C or +50 ° C) when specified by the manufacturer and the equipment shall be provided with instructions in accordance with 46.3 (j) and (k), and 48.3.		P
8	Power Levels		P
8.1	General		P
8.1.1	For all products covered by this Standard, a specific power level will be associated with the eBike.This will require rated voltage and current levels to be assigned, but can also include voltages or currents that are available within the eBike being evaluated. Different approaches can be used based on the potential hazards associated with a given power level.		P

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8.12	For the purposes of this Standard, different designations will be used. This includes hazardous voltage and/or hazardous current resulting in hazardous energy, and in all cases these designations indicate a voltage, current or energy level that is potentially dangerous to the user and means of protection are required. Additional designations cover Low Voltage, Limited Energy (LVLE) which indicates voltage		N/A
8.2	Hazardous Voltage and Hazardous Energy		N/A
8.2.1	Any accessible circuit or accessible part, as determined by the articulate probe in Figure 18.1, that is operating at a voltage above 42.4 volts peak or 60 V dc is considered to be operating at a hazardous voltage. In these cases, the user must be protected against contact with the part or circuit by the use of an enclosure or proper insulation. The requirements for both enclosures and insulation are included in this Standard and shall be applied as appropriate in all cases where hazardous voltages exist.		N/A
8.2.2	Hazardous energy exists in any circuit or part that is operating with a stored energy level of 20 J or more, or has an available continuous power level of 240 VA or more, at a potential of 2 volts or more. In these cases, the user shall be protected against contact with the part or circuit by the use of an enclosure or proper insulation. The requirements for both enclosures and insulation are included in this Standard and shall be applied as appropriate in all cases where hazardous energy exist.	<240VA	N/A
8.3	Low Voltage Limited Energy Circuits		P
8.3.1	A Low-Voltage Limited Energy Circuit (LVLE) shall comply with the limits in Table 8.1.		P
8.3.2	The power limitations in Table 8.1 may be obtained by the use of any of the following configurations:		P
	a) An inherently-limited transformer;		P
	b) A non-inherently-limited transformer coupled with an overcurrent protective device in the output circuit;		N/A
	c) A combination transformer and fixed impedance; or		N/A
	d) An arrangement determined to be equivalent to (a), (b), or (c).		N/A
8.3.3	A part or device, other than the battery pack, located in or supplied by an LVLE circuit need not be investigated. The secondary winding of the transformer, the fuse or circuit protective device, or the regulating network, and all wiring up to the point at which the current and voltage are limited shall be judged under the applicable requirements in this Standard.		N/A

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8.3.4	The maximum load current is to be drawn under any condition of loading, including short circuit, using a resistor. The current is to be measured 60 seconds after the application of the load. The resistor is to be continuously readjusted during this 1 minute period to maintain maximum load current. The measured load current shall not exceed the value listed in Table 8.1.		P
8.3.5	With reference to the voltage limit specified in Table 8.1, measurement is to be made with the product connected to the intended source of supply and with all loading circuits disconnected.		P
8.3.6	The over-current protective device provided in the LVLE circuit used to limit the current shall be rated or set at not more than the values specified in Table 8.1. The device shall not be of the automatically reset type.		N/A
8.3.7	If a regulating network is used to limit the output under any conditions, the LVLE current limitation in Table 8.1 shall not be affected by malfunction of a single component, excluding resistors. The network shall comply with the value in Table 8.1 when the current is measured after 5 seconds.		N/A
9	Combination of Battery, Battery Management System, and Charger		P
9.1	The battery management system (BMS) is used to control battery charging and discharging. For battery packs that are provided with an integral BMS, that BMS shall be evaluated as part of the battery pack in accordance with Battery Packs, Section 11. If the BMS, or a portion of the BMS, resides in components or circuits external to the battery pack, then the combination of the external components and the battery pack is critical to safety and shall be evaluated together in accordance with 9.2.		P
9.2	All testing of the system shall be performed with the actual battery/BMS and charger that is recommended by the manufacturer. Any protection circuits, or other external components or systems, can remain in place provided those circuits or systems are proven to be reliable in accordance with Sections 12 and 19.		P
10	User Protection While Charging		P
10.1	General		P

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10.1.1	Charging of the battery may occur while the battery is installed on the eBike, with the battery removed from the eBike, or both options may apply based on user preference. If the battery is only intended to be charged when it is removed from the eBike, then an inherent means shall be provided to insure that this option is the only option for charging the battery. If no inherent means are provided, and it is possible to charge the battery while on the eBike, the battery shall be considered to be charged both on board and off board the eBike.		P
10.1.2	If the battery is intended to be charged while on the eBike, whether by inherent construction or user preference, then the requirements in 10.2 apply. If the battery is only intended to be charged when removed from the eBike, then the requirements in 10.2 do not apply.		P
10.1.3	The requirements in 10.1.1 and 10.1.2 are to be used in conjunction with the requirements in Section 8. If energy levels are such that no hazard exists, then protection means may be reduced.		P
10.2	Charging batteries that are on the eBike		P
10.2.1	Charging of the battery on an eBike where voltage or energy levels exceed the lower limits for shock hazards or electric energy hazards will require that the exposed conductive surfaces of the eBike are protected and monitored during charging to prevent a shock hazard due to the charging energy supplied to the eBike. The personnel protection system supplied shall be as indicated in 10.2.2.		P
10.2.2	For equipment where the specifics of the installation of the on board electrical system is part of the evaluation, the eBike shall be provided with a system of protection that is considered suitable to protect the user. This may include suitable means such as double insulation systems onboard the eBike. The suitability of the protection system shall be judged based on the requirements in this Standard.		P
10.2.3	With reference to 10.2.2, products utilizing a system of protection based on protective grounding shall comply with the requirements in 10.2.4 and products utilizing a system of protection based on double insulation shall comply with the requirements in 10.2.5.		P
10.2.4	Protection systems relying on protective grounding for user protection shall comply with the applicable requirements for grounding and bonding in Section 22. The requirements shall be applied to all points where protective grounding is used as a means to protect the user.		P

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10.2.5	A system of double insulation provided to protect the user shall be in accordance with the requirements in UL 2097.		N/A
10.2.6	The eBike shall have charger connect-interlock so that the motor cannot be activated when the charger is plugged in. If there is no interlock, there shall be a secondary means of preventing inadvertent motor activation.		P
11	Battery Packs		P
11.1	Battery packs that provide power to the motor shall be provided with an appropriate Battery Management System (BMS) either integral to the pack or as part of a system that includes components and circuits external to the pack. The BMS shall be designed to safely withstand normal and foreseeable misuse conditions for the eBike involved. For a BMS that includes components or circuits external to the battery pack, the BMS shall comply with Safety Circuits and Safety Analysis, Section 12, as applicable. A battery pack used in eBikes covered by this Standard shall comply with one of the following:		P
11.2	A battery pack in accordance with 11.1 (c) and (d) is additionally required to comply with the requirements in Overcharging Test, Section 32.2; Short Circuit Test, Section 32.7; Imbalanced Charging Test, Section 32.8; Shock Test, Section 32.9; Vibration Test (battery method), Section 38.2; and Thermal Cycling Test, Section 32.10.		N/A
11.3	For rechargeable batteries providing power to other than the motor and part of the eBike electrical system, the battery shall comply with UL 62133 or UL 2054.		P
12	Safety Circuits and Safety Analysis		P
12.1	The protective circuits of the electrical system shall undergo a safety analysis as specified in 12.4 to verify that potential hazards associated with the design are addressed in this evaluation. A circuit is defined as a protective circuit if it contains a circuit or a component that is considered critical for mitigating a fire, shock, or explosion hazard in accordance with this Standard.		P
12.2	For battery management systems, the protective circuit shall maintain the cells within their normal operating region for charging and discharging; and, if normal limits are exceeded, the protective circuit shall limit or shut down the charging or discharging to prevent excursions beyond normal operating limits. Compliance is determined through a review of the battery system data including the safety analysis of 12.4 and through the tests in this Standard.		P

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12.3	Protection circuits used to monitor operational parameters, such as maximum assist speed, cutoff assistance due to braking, and the like, shall also be evaluated based on the requirements in this Section as applicable. Compliance is determined through a review of the design and overall system, including the safety analysis of 12.4 and through the tests in this Standard.		N/A
12.4	An analysis of potential hazards shall be conducted on the electrical system of the eBike, including the charger and other safety circuits as applicable, to determine that events that could lead to a hazardous condition have been identified and addressed through design or other means. Documents that can be used as guidance for the safety analysis include:		N/A
12.5	The analysis in 12.4 is utilized to identify anticipated faults or conditions in the system which could lead to a hazardous condition and the types and levels of protection provided to mitigate the potential hazards. The manufacturer shall provide the analysis of 12.4 for review as part of the evaluation of the system. The manufacturer shall indicate potential risks associated with the system and document the level of risk associated with each potential risk. During the review of the analysis during this evaluation, the results associated with the analysis may change or may be modified as deemed appropriate. The analysis shall consider single fault conditions in the protection circuit/scheme as part of the anticipated faults; and faults that occur as a result of those single faults are to be included.		N/A
12.6	When conducting the analysis of 12.4, active devices shall not be relied upon for critical safety unless:		P
12.7	Devices relied upon for safety as noted in 12.4 shall be tested for functionality and reliability in the relevant configuration and environment, in accordance with appropriate functional safety requirements unless already evaluated through the other tests of this Standard. Functional safety criteria can be found in one of the following standards as appropriate to the design of the electronic and software protection scheme:		P
12.8	Any product containing hazardous voltage shall have a manual disconnect to prevent inadvertent access to hazardous voltage parts during servicing. The manual disconnect shall:		P
12.9	If a hazardous voltage automatic disconnect device is provided to isolate accessible conductive parts from the hazardous voltage circuit of the battery system, it shall:		P
13	Enclosing and Insulating Hazardous Parts		P

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13.1	General		N/A
13.1.1	An eBike shall be provided with one or more enclosures that house all live parts that are considered hazardous. The parts of the enclosure that are required to be in place to comply with the requirements for risk of fire, electric shock, injury to persons, and electrical energy – high current levels shall comply with the applicable enclosure requirements specified in this Standard.		N/A
13.1.2	An enclosure shall have the strength and rigidity required to resist the possible physical abuses that it will be exposed to during its intended use, in order to reduce the risk of fire or injury to persons.		N/A
13.2	Materials		P
13.2.1	Nonmetallic materials		P
13.2.1.1	The materials employed for enclosures shall comply with the applicable enclosure requirements outlined in UL 746C and CSA C22.2 No. 0.17, except as modified by this Standard.		P
13.2.1.2	Polymeric materials employed for enclosures shall have a minimum flame rating of V-1 in accordance with Flammability, Section 17, or the enclosure may alternatively be evaluated to the 20 mm end product flame test in accordance with UL 746C and CSA C22.2 No. 0.17.		P
13.2.1.3	The following factors in (a) – (e) shall be taken into consideration when an enclosure employing nonmetallic materials is being evaluated. For a nonmetallic enclosure all of these factors shall be considered with respect to thermal aging. Dimensional stability of a polymeric enclosure is addressed by compliance to the mold stress relief test. Suitability to factors (a) – (e) below may be determined by the tests of this Standard.		P
13.2.1.4	The polymeric materials employed for enclosures and insulation shall be suitable for anticipated temperatures encountered in the intended application. Enclosures shall have a Relative Thermal Index (RTI) with impact suitable for temperatures encountered in the application but no less than 80°C (176°F), as determined in accordance with UL 746B and CSA C22.2 No. 0.17.		P

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13.2.1.5	Materials employed as electrical insulation in the assembly shall be resistant to deterioration that would result in a risk of electrical shock, fire or other safety hazard. Compliance is determined by the tests of this Standard. Materials employed for direct support of live parts at hazardous voltage, shall additionally meet the direct support insulation criteria outlined in UL 746C and CSA C22.2 No. 0.17, unless employed as part of a component that has been evaluated to a suitable component standard. Insulated wiring is subjected to the requirements outlined in Section 18, Internal Wiring and Terminals.		P
13..2.1.6	Gaskets and seals relied upon for safety, shall be determined suitable for the environmental conditions and chemical substances they are anticipated to be exposed to in their end use.		P
13.2.1.7	Enclosure materials intended to be directly exposed to sunlight in the end use application shall comply with the UV Resistance test in accordance with UL 746C and CSA C22.2 No. 0.17.		P
13.2.2	Metallic materials		P
13.2.2.1	Metal enclosures shall be corrosion resistant. A suitable plating or coating process can achieve corrosion resistance. Additional guidance on methods to achieve corrosion protection can be found in UL50E/CSA		P
13.2.2.2	Metal enclosures may be provided with an insulating liner to prevent shorting of live parts to the enclosure. If using an insulating liner for this purpose, the insulating liner shall consist of non-moisture absorbent materials that have a temperature rating suitable for temperatures during operation including charging.		
13.2.2.3	Conductive parts in contact at terminals and connections shall not be subject to corrosion due to electrochemical action.		P
13.3	Strength of Enclosures		P
13.3.1	The enclosure shall be subjected to the Impact Test, Section 33.		P
13.4	Sharp Edges		P
13.4.1	An enclosure, a frame, a guard, a handle, or similar device shall not have sharp edges that constitute a risk of injury to persons in normal maintenance and use.		P
13.5	Ingress Protection		P

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13.5.1	Openings in the enclosure shall be designed to inhibit inadvertent access to hazardous parts. Compliance is determined by the Tests for Protection Against Access to Hazardous Parts Indicated by the First Characteristic Numeral, of IEC 60529, for a minimum IP rating of IP3X. Evaluation per IEC 60529,consists of the use of the Test Rod 2.5 mm, 100 mm long, shown in UL/ULC 2271, applied with a force of 10 N ±10 percent.		P
13.5.2	Openings in an enclosure shall be designed to prevent ingress of water as installed in the intended application in accordance with intended use and IP rating in accordance with IEC 60529, with a minimum rating of IPX4. Compliance is determined by the Ingress Protection Tests in Section 36.		P
14	Mounting		P
14.1	Components mounted on the eBike shall be subjected to the Vibration Test, Section 38.		P
15	Printed Wiring Boards		P
15.1	A printed-circuit board shall comply with the requirements in UL 796, and shall have a flammability rating as indicated in Section 17.		P
15.2	A resistor, capacitor, inductor, or other part that is mounted on a printed-circuit board to form a printed-circuit assembly shall be secured so that it does not become displaced and cause a risk of electric shock or fire by a force that is capable of being exerted on it during assembly, intended operation, or servicing of the power supply.		N/A
16	Spacings and Separation of Circuits		P
16.1	Electrical circuits within the electrical system shall be provided with reliable physical spacing to prevent inadvertent short circuits (i.e., electrical spacings on printed wiring boards, physical securing of uninsulated leads and parts). Insulation suitable for the anticipated temperatures and voltages shall be used where spacings cannot be controlled by reliable physical separation.		P
16.2	Electrical spacings in circus shall have the following minimum over surface and through arspacings as outlined in one of the following		P
16.3	As an alternative to the spacing requirements in 16.2, the spacing requirements in UL 840 and CSAC22.2 No. 0.2, may be used. For determination of clearances, the overvoltage category is considered Overvoltage Category II; and the pollution degree would be Pollution Degree 3 unless reduced by design in accordance with UL 840 and CSA C22.2 No. 0.2.		P

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16.4	As an alternative to the clearance values outlined in UL 60950-1/CSA C22.2 No. 60950-1 in Clearances, Creepage Distances and Distances Through Insulation, the alternative method for determining minimum clearances in the Annex for Alternative Method for Determining Minimum Clearances, Annex G, of the UL 60950-1/CSA C22.2 No. 60950-1 may be applied.		P
16.5	There are no minimum spacings applicable to parts where insulating compound completely fills the casing of a component or subassembly, if the distance through the insulation at voltages above 60 Vdc or above 30 Vrms is a minimum of 0.4 mm (0.02 inch) thick for supplementary or reinforced insulation, and the eBike passes the Dielectric Strength Test, Section 30, and the Isolation Resistance Test, Section 29. There is no minimum insulation thickness requirement for insulation of circuits at or below 60 Vdc or for basic or functional insulation. Some examples include potting, encapsulation, and vacuum impregnation.		P
16.6	Conductors of circuits operating at different voltages shall be reliably separated from each other through the use of mechanical securements such as barriers or wire ties to maintain spacing requirements unless they are each provided with insulation acceptable for the highest voltage involved. An insulated conductor shall be reliably retained so that it cannot contact an uninsulated live part of a circuit operating at a different voltage.		P
17	Flammability		P
17.1	As an alternative, finished enclosures may be tested in accordance with the 20 mm end-product flame test in the Standard for Polymeric Materials – Use in Electrical Equipment Evaluations, UL 746C, and Evaluation of Properties of Polymeric Materials, CAN/CSA C22.2 No. 0.17. Metallic materials used for enclosures are considered to comply without further evaluation.		P
17.2	Nonmetallic materials used for internal parts within the overall enclosure shall be rated V-2 minimum.		P
17.3	Internal parts of components shall comply with the flammability requirements of the component standard in accordance with Components, Section 2.		P
17.4	Small parts, and gaskets, that are not located near live parts, and are located in a manner such that they cannot propagate flame from one area to another within the equipment, are not required to have a specific flame rating.		P

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17.5	Nonmetallic materials located outside the enclosure, and not used to complete the enclosure, are considered decorative parts. These parts do not have a specified flame rating.		P
17.6	Printed wiring board materials used for circuits or components at hazardous voltage or hazardous energy levels shall be rated V-1 minimum.		P
17.7	For the requirements outlined in 17.2 – 17.6, the flammability rating of the material shall be provided as part of the material rating or the flammability rating may be determined in accordance with UL 94 and CAN/CSA C22.2 No. 0.17.		N/A
18	Internal Wiring and Terminals		P
18.1	Wiring shall be insulated and acceptable for the purpose, when considered with respect to temperature, voltage, and the conditions of service to which the wiring is likely to be subjected within the equipment.		P
18.2	Wiring internal to an enclosure shall be routed, supported, clamped or secured in a manner that reduces the likelihood of excessive strain on wire and on terminal connections; loosening of terminal connections; and damage of conductor insulation. In safety critical circuits, for soldered terminations, the conductor shall be positioned or fixed so that reliance is not placed upon the soldering alone to maintain the conductor in position.		P
18.3	An external terminal shall be designed to prevent inadvertent shorting. An external terminal shall be designed to prevent inadvertent misalignment or disconnection when the eBike is in use.		N/A
18.4	An external terminal for charging shall be designed to prevent an inadvertent shorting and misalignment and a reverse polarity connection when connected to the charger.		N/A
18.5	Any other external terminals with hazardous voltage shall be designed to prevent access by the user. Any external terminals with hazardous energy level as determined in accordance with 8.2.2 shall not be bridged by a metallic object. Compliance is determined by use of the articulate probe shown in Figure 18.1.		N/A
18.6	A hole by which insulated wires pass through a metal wall shall be provided with a smoothly rounded bushing or shall have smooth surfaces, free of burrs, fins, sharp edges, and the like, upon which the wires may bear, to prevent abrasion of the insulation.		P

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18.7	Wiring for hazardous voltage on board the eBike shall be enclosed in junction boxes with hazardous voltage warning labels such as ISO 7010, No. W012 (i. e. lightning bolt within triangle), or shall be protected by suitable enclosures that are not accessible to the user.		P
18.8	Wires that are subjected to flexing during normal operation or due to user accessibility shall be subjected to the Flexing Test, Section 35.		P
19	Overcurrent Protection		P
19.1	Power, control and auxiliary circuits shall have overcurrent protection that is sized to prevent overheating of the smallest size conductor.		P
19.2	The need for overcurrent protection in the power circuit to motors, whether one protective device for each motor or one device for multiple motors, is to be determined on the basis of the locked rotor and running overload tests described in Section 32.		P
19.3	Overcurrent devices in the control and power circuit shall be physically located the shortest distance possible from the power supply or battery		N/A
19.4	The need for overcurrent protection in the LVLE circuits is to be determined on the basis of theequirements described in Low-voltage Limited Energy Circuit 8 .3		N/A
19.5	The overcurrent protective device specified in 19.4 shall be a circuit breaker, fuse or positive temperature coefficient device.		P
19.6	A fuse or circuit breaker shall be either:		N/A
19.7	A positive temperature coefficient device shall comply with Manufacturing Deviation and Drift; Endurance; and Requirements for Controls Using Thermistors, in UL 60730-1/CSA C22.2 E60730-1. The positive temperature coefficient device shall be tested and determined to comply in the actual battery configuration and environment.		N/A
19.8	Fuses shall be acceptable for the current and voltage of the circuit they are protecting and shall comply with 19.9 and 19.10. Fuses shall be tested and determined to comply in the actual battery configuration and environment.		N/A
19.9	Fuses provided for protection of circuits or outputs shall comply with CSA C22.2 No.248.1/UL 248-1 and the applicable parts of the series. Fuseholders used with these fuses shall comply with CSA C22.2 No. 4248.1/UL 4248-1 and the applicable parts of the series.		N/A

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19.10	For user replaceable fuses, a fuse replacement marking in accordance with 44.3 shall be located adjacent to each fuse or fuse holder, or on the fuse holder, or in another location provided that it is obvious to which fuse the marking applies. Where user replaceable fuses with special fusing characteristics such as time delay or breaking capacity are necessary, the type shall also be indicated. Information on proper fuse replacement of user replaceable fuses shall also be included in the instructions. See Section 47.		N/A
20	Motors and Motor Controllers		P
20.1	A traction motor used in a eBike shall not be hazardous under locked rotor and overload conditions. Compliance is determined by the tests of this standard unless previously evaluated as part of a motor and motor protector combination evaluation.		P
20.2	Motors shall be capable of carrying the maximum normal anticipated load without exceeding temperatures on insulation and windings as determined during the temperature test.		P
20.3	Motors located in hazardous voltage circuits shall comply with the requirements of UL 1004-1 and CSA-C22.2 No. 100. Motors located in low voltage circuits shall comply with either UL 1004-1 or CSA C22.2 No. 100 or the requirements of this Standard.		P
20.4	Sensors and controls associated with the motor control, either as a stand-alone component or system, provided to perform a safety function shall comply with the applicable requirements in the appropriate controls standard in accordance with 2.1. For eBikes and EPACs provided with a startup assistance function, the control for providing startup assistance shall require a voluntary and continuous action by the user to allow startup assistance, such as the use of a dead man switch.		N/A
20.5	In addition to the testing associated with the control of the motors in this Standard, hazards associated with the motor control shall be included in the analysis required in Safety Circuits and Safety Analysis, Section 12.		N/A
21	Operator Interface		N/A
21.1	The operator interface shall be constructed such that the user will not have access to hazardous parts. If hazardous parts exist in the operator interface, then the operator interface shall comply with the requirements for enclosing hazardous parts in Section 13. Also, the interface shall comply with 21.2.		N/A

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21.2	An operator interface with internal battery circuits and/or a touchscreen with high voltage backlights shall be evaluated as Limited Current Circuits in accordance with UL 60950-1/CSA C22.2 60950-1 or UL 62368-1/CSA C22.2 No. 62368-1.		P
22	Grounding and Bonding		N/A
22.1	General		N/A
22.1.1	For eBikes that are using a grounded system of protection to mitigate hazards associated with electric shock or electrical energy while charging, a means of extending the ground to the eBike through a bonding conductor shall be provided.		N/A
22.1.2	The requirement in 22.1.1 applies for both on board chargers and off board chargers.		N/A
22.2	Bonding connections		N/A
22.2.1	For grounded systems, there shall be provision for bonding all dead metal parts of an eBike to the main ground connection. This requirement applies to all dead metal parts that are exposed or that possess a risk of being contacted by a person during intended operation or adjustment and that are capable of becoming energized as a result of electrical malfunction.		N/A
22.2.2	The bonding shall be by a positive means, such as by clamps, rivets, bolted or screwed connections, or by welding, soldering, or brazing with materials having a softening or melting point greater than 455°C (850°F). The bonding connection shall penetrate nonconductive coatings, such as paint or vitreous enamel. Bonding around a resilient mount shall not depend on the clamping action of rubber or similar material.		N/A
22.2.3	An equipment-bonding terminal, or lead-bonding point, shall be connected to the frame or enclosure by a positive means, such as by a bolted or screwed connection. To reduce the risk of inadvertent loosening, the head of the screw or bolt shall not be accessible from outside of the enclosure.		N/A
22.2.4	An equipment-bonding connection shall penetrate a nonconductive coating, such as paint or vitreous enamel.		N/A
22.2.5	An equipment-bonding point shall be located so that the risk of inadvertently removing the bonding means during servicing is reduced.		N/A
22.2.6	An equipment-bonding lead shall be the same size as the grounding lead associated with the AC power source. The surface of the insulation shall be green.		N/A

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22.2.7	For eBikes that are connected to NEMA 5-20R receptacles directly, the equipment-grounding conductor of a power-supply cord shall be connected to dead metal parts within the frame or enclosure by means of a screw, or stud and nut combination, or other equivalent means, not to be removed during ordinary servicing not involving the power-supply cord. T		N/A
22.2.8	An equipment-grounding conductor or equipment-bonding conductor shall not be spliced, nor shall it involve a trace on a printed wiring board.		N/A
22.2.9	A soldering lug, a connection means that depends on solder only, a screwless (push-in) connector, a quick-connect, or other friction-fit connector shall not be used for equipment-grounding or equipment-bonding.		N/A
22.2.10	The equipment-grounding terminal or equipment-bonding terminal shall be capable of securing a conductor of a size intended for the application.		N/A
22.2.11	A terminal intended for the connection of an equipment-bonding conductor shall be identified by:		N/A
23	Chargers		P
23.1	The charger used to recharge the battery shall comply with one of the following:		P
23.2	For chargers that comply with 23.1 (b), no hazard exists at the output of the charger and requirements to mitigate a shock hazard or an energy hazard may be reduced as described in 8.3.		P
23.3	Chargers that comply with 23.1 (a), (c), or (d) are not necessarily limited at the output and the requirements for hazard mitigation for electrical systems connected to the output of the charger apply. Personnel protection in accordance with Section 10 shall be provided.		N/A
23.4	Chargers for lithium-ion battery systems shall have voltage, current, and temperature monitoring of the cells in the battery pack. This monitoring may be part of the battery management system integral to the battery pack. In this case, compliance with Section 11 is sufficient. If the monitoring is part of circuits or components located outside the battery pack, then those circuits or components shall be evaluated as part of the overall battery management system and shall be subjected to the risk assessment of Section 12.		P
24	Electrical Cables and Connectors Between the eBike and the Equipment		N/A

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24.1	Cables that are used to connect the off board equipment to the eBike shall be permanently connected to the charger or connected to the charger with a connector that complies with 24.2. The cable shall comply with UL 62/CSA C22.2 No. 49, and shall be suitably rated for the voltage and temperature it will be subjected to in the end use application and shall be sufficiently sized to conduct the anticipated current.		N/A
24.2	Connectors used to connect the off board equipment to the eBike or EPAC shall comply with UL2251/CSA C22.2 No. 282, or UL 1977 and CSA C22.2 No. 182.3. The connectors shall be suitably rated for the application.		N/A
25	Supply Connections		P
25.1	For all equipment located off board the eBike and transferring power to the eBike, the connection to the supply source will be in accordance with the applicable standard for that equipment. See Chargers, Section 23.		P
26	General		P
26.1	The performance tests are to be conducted on representative electrical systems of eBikes as appropriate.		P
26.2	Testing is to be conducted at any ambient temperature between 5°C (41°F) and 35°C (95°F).		P
26.3	Unless indicated otherwise, batteries are to be fully charged to the maximum operating state of charge in accordance with the manufacturer's specifications. After charging and prior to testing, the batteries are to be allowed to rest for a maximum period of 8 hours at room ambient.		P
26.4	Tests may be conducted on a test track, a bench or a test stand, which keeps the driven wheel free of the ground.		P
26.5	If conducted on a test track, the test track is to be level and the wind speed is to not exceed 3 m/s (6.7 mph).		N/A
26.6	In all cases, worst case conditions to simulate maximum normal load are to be selected.		N/A
26.7	The test area is to be well ventilated to protect personnel from possible harmful fumes or gases. As an additional precaution, the temperatures on surface of at least one cell/module within the device are to be monitored during the test for safety and information purposes. All personnel involved in the testing are to be instructed to never approach the test unit until temperatures are falling and have returned to within ambient temperatures.		P
26.8	Unless noted otherwise in the individual test methods, the tests shall be followed by a 1-h observation time prior to concluding the test and temperatures are to be monitored.		P

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26.9	Products that are operational after tests associated with the battery shall be subjected to a minimum of one cycle of charging and discharging in accordance with the manufacturer's specifications to determine that there is no fire, explosion, rupture, electrolyte leakage, or shock hazard associated with the stressed battery.		N/A
27	Input Test		P
27.1	The input current to a product is to be measured with the unit operating while charging a fully discharged battery. The current input of the product shall not be more than 110 percent of the rated current value for the eBike as assigned by the manufacturer and if an external charger is used, the measured input current shall not exceed the rated output current of the external charger.		P
28	Temperature Test		P
28.1	The Temperature test shall be conducted to determine whether or not the temperature sensitive safety critical components and temperature sensitive materials in the eBike components are being maintained within their temperature ratings and that temperatures on accessible surfaces, which may be contacted by the user, are within acceptable limits. Additionally, this test is conducted to determine whether or not the component cells are being maintained within their specified operating limits during maximum charge and discharge conditions of the eBike.		P
28.2	The test is to be performed using two methods. The battery charging circuit and battery are tested in accordance with 28.3 – 28.7, and the eBike system is tested in accordance with 28.8 – 28.9.		P
28.3	First, a fully discharged battery pack is to be conditioned within a chamber set to the upper limit charging temperature specifications of the eBike manufacturer. After thermal stabilization in the chamber,the battery pack is to be connected to a charging circuit input representative of anticipated maximum charging parameters provided by the specified charger. The battery pack shall then be subjected to maximum normal charging while monitoring voltages and currents on cells until it reaches the manufacturer's specified fully charged condition. Temperatures shall be monitored on temperature sensitive components including cells, enclosure, and all parts within the charging circuit that are temperature sensitive, including any user accessible surfaces.		N/A

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28.4	While still in the conditioning chamber, and after allowing temperatures to stabilize, the fully charged battery pack shall then be discharged in accordance with the manufacturer's specifications representative of maximum weight and operating conditions for loading down to the manufacturer's specified end of discharge condition while monitoring voltage and current on cells until the battery pack reaches its specified end of discharge voltage (EODV). Temperatures shall be monitored on temperature sensitive safety critical components including cells, enclosure, and all parts within the charging circuit that are temperature sensitive, including any user accessible surfaces.		N/A
28.5	The charge and discharge cycles are then repeated for a total of 2 complete cycles of charge and discharge. The test is then repeated with the representative unit in a chamber set to the eBike system manufacturer's lowest specified operating ambient for 2 complete cycles of charge and discharge. If the battery pack will not operate at the lowest ambient rating, then a temperature as close as possible to the lower ambient rating which allows the battery pack to operate shall be used.		P
28.6	During the temperature test, the voltage and current during discharge and charging of the component cells is monitored to determine that they are not outside of the specified cell manufacturer's operating region.		P
28.7	The manufacturer's specified limits (voltage, current and temperatures measured) shall not be exceeded during the charging and discharging cycles. Temperatures measured on components shall not exceed their specifications. See Table 28.1 and Table 28.2 for surface and component temperature limits.		P
28.8	The eBike shall be powered from a power source used to represent a battery pack. The eBike system is then operated at the maximum load on motors continuously until thermal stabilization. See 28.10.		N/A
28.9	Temperatures shall be monitored on all temperature sensitive components, enclosures, and user accessible surfaces. Temperatures measured on components shall not exceed their specifications. See Table 28.1 and Table 28.2 for surface and component temperature limits.		N/A
28.10	A temperature is determined to be stabilized when three successive readings taken at intervals of 10 percent of the previously elapsed duration of the test, but not less than 15 minutes, indicate no increase greater than 2°C (4°F).		N/A

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28.11	At the conclusion of this test, the battery pack tested under the battery method is placed back into the eBike system. Any hazardous voltage circuits shall be subjected to an Isolation Resistance Test,Section 29, (without humidity conditioning) or a Dielectric Strength Test, Section 30.		N/A
28.12	As a result of this test, in addition to temperatures remaining below the limits, there shall be no indication of fire, explosion, rupture, electrolyte leakage or electric shock.		N/A
29	Isolation Resistance Test		N/A
29.1	This test is intended to determine that insulation of the equipment provides adequate isolation of hazardous voltage circuits from accessible conductive parts and that the insulation is non-hygroscopic. The measured insulation resistance between the positive terminals and accessible parts of the equipment shall be at least 50,000 Ω.		N/A
29.2	Equipment with accessible parts shall be subjected to an insulation resistance test between the positive terminal and accessible dead metal parts. If the accessible parts are covered with insulating material that may become live in the event of an insulation fault, then the test voltages are applied between each of the live parts and metal foil in contact with the accessible parts as shown in 30.4 and Figure 30.1.		N/A
29.3	The insulation resistance shall be measured after a 60-s application with a high resistance voltmeter using a 500 V dc potential applied for at least 1 minute to the locations under test.		N/A
29.4	The test shall be repeated on a representative unit subjected to humidity conditioning in accordance with Section 31. Measurements shall be made with the unit still in the chamber.		N/A
30	Dielectric Strength Test		P
30.1	This test is an evaluation of the electrical spacings and insulation at hazardous voltage circuits within the equipment. There shall be no evidence of a dielectric breakdown (breakdown of insulation resulting in a short through insulation/arcing over electrical spacings) as evidenced by an appropriate signal from the dielectric withstand test equipment as a result of the applied test voltage. Corona discharge or a single momentary discharge is not regarded as a dielectric breakdown (i.e., insulation breakdown).		P

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30.2	Circuits at 60 Vdc or higher shall be subjected to a dielectric withstand voltage consisting of a dc potential of twice the rated dc voltage or twice the rated ac voltage times 1.414. Semiconductors or similar electronic components liable to be damaged by application of the test voltage may be bypassed or disconnected.		P
30.3	The test voltage is to be applied between the hazardous voltage circuits and non-current carrying conductive parts that may be accessible.		P
30.4	If the accessible parts of the equipment are covered with insulating material that may become live in the event of an insulation fault, then the test voltages are applied between each of the live parts and metal foil in contact with the accessible parts. The metal foil shall be wrapped tightly around and in intimate contact with the accessible part.		N/A
30.5	The test voltages shall be applied for a minimum of 1 minute with the cells/modules disconnected to prevent charging during application of the voltage.		N/A
30.6	The test equipment shall consist of a 500 VA or larger capacity transformer, the output voltage, which is variable and which is essentially sinusoidal if using an ac test method and dc output if using a dc test method. There is no trip current setting for the test equipment since the test is checking for insulation breakdown, which results in a large increase of current. Setting a trip current may result in a false failure of this test, as it may not be indicative of insulation breakdown.		N/A
31	Humidity Conditioning		P
31.1	A product shall comply with the requirements for the Dielectric Strength Test, Section 30, and the Isolation Resistance Test, Section 29, following exposure to air having a relative humidity of 88 ±2 percent at a temperature of 32 ±2°C (90 ±4°F).		P
31.2	To determine whether a unit complies with the requirement in 31.1, a representative unit is to be heated to a temperature just above 34°C (93°F) to reduce the risk of condensation of moisture during conditioning. The heated unit is to be placed in the humidity chamber and is to remain for 48 hours under the conditions specified in 31.1. Immediately following the conditioning, the unit is to be removed from the humidity chamber and tested as described in 31.1.		P
32	Abnormal Operations Tests		P
32.1	General		P

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32.1.1	A unit shall not emit flame or molten metal or become a risk of fire, electric shock, or injury to persons when subjected to the tests specified in 32.2 – 32.10. Separate representative units are to be used for conducting these tests, unless requested otherwise by the manufacturer.		P
32.1.2	Following each test, any hazardous voltage circuits shall be subjected to an Isolation Resistance Test, Section 29, (without humidity conditioning) or a Dielectric Strength Test, Section 30.		P
32.1.3	A risk of fire, electric shock, or injury to persons exists when:		P
32.1.4	During these tests the unit is to be placed on a softwood surface covered with a white tissue paper and a single layer of cheesecloth is to be draped loosely over the entire enclosure. The cheesecloth is to be untreated cotton cloth running 14 – 15 yards per pound (26 – 28 m2 /kg), and having, for any square inch, a count of 32 threads in one direction and 28 in the other direction.		P
32.1.5	The supply circuit is to have branch circuit overcurrent protection, the size of which equals 125percent of the input current rating (20-ampere minimum), except where this value does not correspond with the standard rating of a fuse or circuit breaker, the next higher standard device rating shall be used. The test voltage and frequency are to be adjusted to the rated values.		P
32.1.6	A unit with a conductive enclosure shall have the enclosure of the unit connected directly to ground.		N/A
32.1.7	Each test is to be continued until further change as a result of the test condition is reduced significantly. When an automatically reset protector functions during a test, the test is to be continued for 7 hours. When a manual reset protector functions during a test, the test is to be continued until the protector is operated for 10 cycles using the minimum resetting time, and not faster than 10 cycles of operation per minute. The following are examples of test terminations:		N/A
32.1.8	When the manually reset protector is a circuit breaker that complies with CSA C22.2 No. 5 / UL489, it is to be operated for 3 cycles using the minimum resetting time and not faster than 10 cycles of operation per minute.		P
32.1.9	A manual reset protector that becomes inoperative in the open condition shall be operated between 10 cycles and 3 cycles.		P
32.1.10	With reference to 32.1.7(b), when the branch circuit overcurrent protection device terminates the test, the instruction manual shall contain the information specified in 46.3(i).		P
32.2	Overcharging test		P

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32.2.1	This test is intended to evaluate the ability of the electrical system of the eBike to withstand an overcharge condition under a single fault in the charging control circuitry that could result in an overcharge condition. One representative system is to be tested for each fault condition applied. The same system can be used for more than one test if it remains functional after the fault is removed. For battery packs in accordance with 11.1(a) or 11.1(b), this test is not required.		P
32.2.2	A fully charged battery is to be discharged at a constant discharge rate of 0.2 times the manufacturer's rated capacity of the battery, or a higher discharge rate permitted by the manufacturer to the manufacturer's specified end-of-discharge voltage. The first representative system is then subjected to a constant current charging at the manufacturer's specified charging rate (i.e. based upon the maximum intended charger output current rate) under a single fault condition in the charging protection circuitry that could lead to an overcharge condition. Protective devices that have been determined reliable may remain in the circuit. For information purposes, temperatures are to be monitored on the cell/module where temperatures may be highest. The output control circuitry of external chargers with standardized output connectors that may result in the use of unspecified chargers shall not be considered as a reliable control to prevent an overcharging condition.		P
32.2.3	The test is to be continued until the voltage has reached 110 percent of the maximum specified voltage limit and/or monitored temperatures return to ambient or steady state conditions and an additional 2 hours has elapsed, or explosion/fire occurs. If the system is operational after the test, it shall be subjected to a minimum of one charge/discharge cycle at the manufacturer's maximum specified values. The test shall be followed by a 1-hour observation time prior to concluding the test and temperatures are to be monitored.		P
32.2.4	At the conclusion of the observation period, systems that contain hazardous operating voltages shall be subjected to a Dielectric Voltage Withstand Test, Section 30, or an Isolation Resistance Test, Section 29, (without humidity conditioning).		P
32.2.5	If a protective device in the circuit operates, the test is repeated at 90 percent of the trip point of the protection device or at some percentage of the trip point that allows charging for at least 10 minutes. Temperatures shall be measured on the cell/module where temperatures may be highest for monitoring purposes.		N/A

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32.2.6	As a result of the overcharge test, there shall be no indication of any noncompliant results as outlined in 32.1.		N/A
32.3	Component fault tests		P
32.3.1	A component, such as a capacitor diode, solid state desimilar device		P
32.4	Forced ventilation/blocked ventilation		P
32.4.1	A unit having forced ventilation is to be operated with the rotor of a blower motor or fan locked. For a unit having more than one blower motor or fan, the test is to be conducted with the rotor of each blower motor or fan locked, one at a time, unless agreeable to all for which all blower motors or fans shall be locked at the same time.		P
32.4.2	A unit having filters over ventilation openings is to be operated with the openings blocked to represent clogged filters. The test is to be conducted initially with the ventilation openings blocked 50 percent, then to be repeated under fully blocked condition.		P
32.5	Locked rotor motor test		P
32.5.1	This test is intended to evaluate a motor's ability to safely withstand a locked rotor condition, which may occur in the end use application. This test is waived if the motor and its locked rotor protection has already been evaluated as part of a motor and motor protector combination evaluation, in accordance with UL 1004-3 and CSA C22.2 No. 77, or UL 1004-7 and CSA C22.2 No. 77, or if relying on impedance protection in accordance with UL 1004-2 and CSA C22.2 No. 77, as applicable.		P
32.5.2	The motor is operated at the voltage used in the eBike application and with its rotor locked for 7 h or until steady conditions are established. The motor is to be tested while on the eBike and temperatures on windings are to be monitored. As an alternative, the motor can be tested outside of the eBike.		P
32.5.3	If the design or size of the motor prevents the measuring of temperatures on the windings, the test may be conducted with the motor removed from the eBike and instead of monitoring temperatures, the motor is to be supported on a surface covered with a single layer of tissue paper with the motor covered with a single layer of cheesecloth.		N/A
32.5.4	If the motor contains a hazardous voltage circuit, the motor shall be subjected to a Dielectric Voltage Withstand Test, Section 30, or Isolation Resistance Test, Section 29, (without humidity conditioning).		N/A

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32.5.5	If monitoring temperatures on windings during the locked rotor test, the temperatures on the windings shall not exceed the values noted in Table 32.1. If not monitoring temperatures on windings during the test, there shall be no sign of ignition of the tissue or cheesecloth at the conclusion of the test.		N/A
32.6	Running overload test		N/A
32.6.1	This test is intended to evaluate a motor's ability to safely withstand an overload condition, which may occur in the end use application. This test is waived if the motor and its overload protection has already been evaluated as part of a motor and motor protector combination evaluation in accordance with UL 1004-3 and CSA C22.2 No. 77, or UL 1004-7 and CSA C22.2 No. 77, as applicable to the method of thermal protection.		N/A
32.6.2	The motor is to be tested while in the eBike and temperatures on windings are to be monitored. As an alternative, the motor can be tested outside the eBike.		N/A
32.6.3	The motor is first operated under maximum normal load conditions. The load is then increased so that the current is increased in appropriate gradual steps with the motor supply voltage being maintained at its original value. When steady state temperature conditions are established the load is again increased. The load is thus progressively increased in appropriate steps until either the overload protection device operates or the motor winding becomes an open circuit.		N/A
32.6.4	The motor winding temperatures are determined during each steady period and the maximum temperature recorded shall not exceed the value in Table 32.2.		N/A
32.6.5	If the design or size of the motor prevents the measuring of temperature windings, the test may be conducted with the motor removed from the eBike and instead of monitoring temperatures, the motor is to be supported on a surface covered with a single layer of tissue paper with the motor is covered with a single layer of cheesecloth.		N/A
32.6.6	If the motor contains a hazardous voltage circuit, the motor shall be subjected to a Dielectric Voltage Withstand Test, Section 30, or Isolation Resistance Test, Section 29, (without humidity conditioning).		N/A
32.6.7	If monitoring temperatures on windings during the overload test, the temperatures on the windings shall not exceed the values noted in Table 32.2. If not monitoring temperatures on windings during the test, there shall be no sign of ignition of the tissue or cheesecloth at the conclusion of the test.		N/A
32.7	Short circuit test		P

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32.7.1	This test evaluates the ability of the battery pack to withstand a short circuit condition under a single fault in the charging control circuitry. For battery packs in accordance with 11.1(a) or 11.1(b), this test is not required.		P
32.7.2	A fully charged representative battery pack is to be short-circuited by connecting the positive and negative terminals of the battery pack with a circuit load having a total resistance of less than or equal to 20 mohms.		P
32.7.3	Representative battery packs are to be subjected to a single fault across any protective device in the charging control circuit. Protective devices that have been determined reliable may remain in the circuit.		P
32.7.4	The representative battery pack shall be discharged until the battery pack has returned to ambient temperature or fire or explosion occurs. Temperatures shall be measured on the cell/module where temperatures may be highest for monitoring purposes.		N/A
32.7.5	If the electrical system of the eBike is operational after the test, it shall be subjected to a minimum of one charge/discharge cycle at the manufacturer's maximum specified values. The test shall be followed by a 1-hour observation time prior to concluding the test and temperatures are to be monitored.		N/A
32.7.6	If a protective device in the circuit operates, the test is repeated at 90 percent of the trip point of the protection device or at some percentage of the trip point that allows discharging for at least 10 min.		N/A
32.7.7	At the conclusion of the test and after cooling to near ambient, representative battery packs that contain a hazardous operating voltage shall be subjected to a Dielectric Voltage Withstand Test, Section 30, or an Isolation Resistance Test, Section 29, (without humidity conditioning).		N/A
32.7.8	As a result of the Short Circuit Test, there shall be no indication of any noncompliant results as outlined in 32.1.		N/A
32.8	Imbalanced charging test		P
32.8.1	This test is to determine whether or not the battery pack, with series connected cells, can maintain the cells within their specified operating parameters if it becomes imbalanced. For battery packs in compliance with 11.1(a) or 11.1(b), this test is not required.		P
32.8.2	A fully charged battery pack of an eBike shall have all of its cells with the exception of one cell/cell block discharged to its specified fully discharged condition. The undischarged cells shall be discharged to approximately 50 percent of its specified state of charge (SOC) to create an imbalanced condition prior to charging.		P

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32.8.3	If the battery pack is operational after the test, it shall be subjected to a minimum of one charge/discharge cycle at the manufacturer's maximum specified values. The test shall be followed by a 1-hour observation time prior to concluding the test and temperatures are to be monitored.		N/A
32.8.4	At the conclusion of the observation period, battery packs that contain hazardous operating voltages shall be subjected to a Dielectric Voltage Withstand Test, Section 30, or an Isolation Resistance Test, Section 29 (without humidity conditioning).		N/A
32.8.5	As a result of the test, there shall be no indication of any noncompliant results as outlined in 32.1.		N/A
32.9	Shock test		N/A
32.9.1	This test is intended to determine whether or not the battery pack can withstand a mechanical shock that may occur when in use. For battery packs in compliance with 11.1(a) or 11.1(b), this test is not required.		N/A
32.9.2	The fully charged battery pack is to be secured to the testing machine by means of a rigid mount,which supports all mounting surfaces of the sample. Temperatures on the center cell are monitored for information purposes.		N/A
32.9.3	The battery pack is to be subjected to mechanical shock testing with parameters as shown in Table 32.3. The shocks are to be applied in all 6 spatial directions.		N/A
32.9.4	If the electrical system of the device is operational after the test, it shall be subjected to a minimum of one charge/discharge cycle at the manufacturer's maximum specified values. The test shall be followed by a 1-hour observation time prior to concluding the test and temperatures are to be monitored.		N/A
32.9.5	At the conclusion of the observation period, devices that contain hazardous operating voltages shall be subjected to a Dielectric Voltage Withstand Test, Section 30, or an Isolation Resistance Test, Section 29 (without humidity conditioning).		N/A
32.9.6	As a result of the test, there shall be no indication of any noncompliant results as outlined in 32.1.		N/A
32.10	Thermal cycling		N/A
32.10.1	This test determines the ability of the battery pack of the eBike to withstand exposure to rapidly changing environments such as when the eBike is entering or exiting a heated storage facility after being in a cold environment, changing temperatures during transport or storage outdoors, and the like, without evidence of damage that could lead to a hazardous event.		N/A

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32.10.2	A fully charged battey shall be subjected to the thermal cycing in accordance with 32.10.3		N/A
32.10.3	For the test, the battery or battery system shall be placed in a chamber with ambient air cycling at the temperature extremes of the manufacturer's recommended ambient range. The transition period between exposure temperatures is to be 15 minutes or less. This swing of temperature variations may be performed either through the use of a fast-response chamber, or by moving the battery or battery system between two chambers at the two test temperatures. The battery or battery system shall remain at each temperature extreme for as long as required for the battery or battery system to reach a uniform temperature (±5°C) of the chamber temperature but no less than 6 hours. A total of five cycles (at the high and low temperature extremes) are to be performed.		N/A
32.10.4	If the battery pack is operational after the test, it shall be allowed to return to room ambient and then subjected to a minimum of one charge/discharge cycle at the manufacturer's maximum specified values. The test shall be followed by a 1-hour observation time prior to concluding the test and temperatures are to be monitored.		N/A
32.10.5	At the conclusion of the observation period, battery or battery systems that contain hazardous operating voltages shall be subjected to a Dielectric Voltage Withstand Test, Section 30, or an Isolation Resistance Test, Section 29 (without humidity conditioning).		N/A
32.10.6	As a result of this test, there shall be no indication of any noncompliant results as outlined in 32.1.		N/A
33	Impact Test		P
33.1	unit acting as an enclosure shall be subjected to this test. The enclosure is to be subjected to an impact of 6.8 J (5 foot-pounds) on any surface that is exposed to a blow during normal use. This impact is to be produced by dropping a steel sphere, 50.8 mm (2 inches) in diameter and weighing 535 g (1.18pounds), from a height of 1.29 m (51 inches) to produce the 6.8 J (5 foot-pound) impact. For surfaces other than the top, the steel sphere is to be suspended by a cord and swung as a pendulum, dropping through a vertical distance of 1.29 m (51 inches) to strike the surface.		P
33.2	A unit is to be subjected to the impact test described in 33.1 with or without any attachment specified by the manufacturer so as to result in the most severe test.		P

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33.3	When the part under test is made of polymeric material, the impact test is to be first conducted on a representative unit or units in the as-received condition. The test is then to be repeated on a different unit or units that have been cooled to room temperature after being conditioned for 7 hours in an air oven operating at 10°C (18°F) higher than the maximum operating temperature of the material, and not less than 70°C (158°F). While being conditioned, a part is to be supported in the same manner in which it is supported on the unit.		P
33.4	Upon being removed from the oven mentioned in 33.3 and before being subjected to the impact test, no units shall show signs of cracking or other deleterious effects from the oven conditioning, and no unit shall be distorted so as to result in a risk of injury to persons.		N/A
33.5	After the impact test, any openings resulting from the test shall be evaluated for access to hazardous live parts using the articulate probe shown in Figure 18.1.		N/A
34	Mold Stress		P
34.1	This test is intended to evaluate whether any shrinkage or distortion exists on a molded or formed thermoplastic enclosure due to release of internal stresses caused by the molding or forming operation and result in the exposure of hazardous parts or reduction of electrical spacings.		P
34.2	The representative units are to be placed in a full-draft circulating-air oven maintained at a uniform temperature of 70°C (158°F) or 10°C (18°F) higher than the maximum temperature observed on the part during the Temperature Test, Section 28, whichever is higher. The units are to remain in the oven for 7hours.		P
34.3	To inhibit hazards from overheating energized cells, units shall be fully discharged prior to conditioning.		P
34.4	After careful removal from the oven, the units shall be allowed to cool to room temperature and then examined. After the examination, the units shall be subjected to a Dielectric Strength Test, Section 30, or sIsolation Resistance Test, Section 29, (without humidity conditioning).		N/A
34.5	There shall be no damage of the eBike system enclosure that would allow hazardous voltage parts to be accessed by use of the test rod 2.5 mm diameter, 100 mm long, shown in UL/ULC 2271, and the articulate probe shown in Figure 18.1.		N/A
35	Flexing Test		P

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35.1	After wiring has been subjected to flexing as described in 35.2, the unit shall be subjected to the Dielectric Voltage-Withstand Test in Section 30 and the wiring is to be examined for damage to determine where any conductors are broken or where individual strands have penetrated the insulation.		P
35.2	Wiring that is subjected to movement at times other than installation and servicing is to be tested by cycling the moving part through the maximum travel intended for the construction. The duration of the test is to be 500 cycles.		P
36	Ingress Protection Tests		N/A
36.1	This test is intended to evaluate the ability of the eBike to withstand potential water exposure in its sintended use and is conducted in accordance with the test method outlined in 36.2.		N/A
36.2	The enclosure shall be subjected to a water exposure test in accordance with the Standard for Degrees of Protection Provided by Enclosures (IP Code), IEC 60529, Tests for Protection Against Water Indicated by the Second Characteristic Numeral 4 (IPX4), unless the equipment is provided with a higher IP Code rating by the manufacturer, in which case the equipment shall be tested in accordance with its rating. During this test, the enclosure is to be mounted in the manner intended when installed on the eBike.If multiple mounting orientations are allowed, then each one is to be tested individually		N/A
36.3	If the equipment is operational after the test, it shall be subjected to a minimum of one charge/discharge cycle at the manufacturer's maximum specified values. The test shall be followed by an observation period in accordance with 26.8.		N/A
36.4	At the conclusion of the observation period, the units shall be subjected to a Dielectric Strength Test, Section 30, or an Isolation Resistance Test, Section 29, (without humidity conditioning).		N/A
36.5	As a result of the test, there shall be no indication of fire, explosion, rupture, electrolyte leakage, or shock hazard.		N/A
37	Permanence of Marking		P
37.1	The purpose of this test is to evaluate the permanence of an adhesive label that has not been subjected to a previous evaluation program		P
37.2	An adhesive label secured to a surface representative of the end use application and is subjected to the following conditioning. The label is rubbed by hand for 15 s with a piece of cloth soaked with water. This is then repeated using petroleum spirit.		P

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37.3	The petroleum spirit to be used for the test is an aliphatic solvent hexane having:		P
37.4	After the conditioning outlined in 37.2, the unit is to be examined for signs of damage including curing and to determine if the marking is still legible. The unit is also examined to determine if it can be removed easily by hand from the adhered surface.		P
37.5	As a result of the conditioning, the representative label shall remain legible, show no evidence of damage including curling and shall not be able to be easily removed by hand from the adhered surface.		P
38	Vibration Test		P
38.1	Complete device		P
38.1.1	An eBike system, or parts of the system, intended to be permanently mounted on an eBike shall be subjected to a vibration test. After the unit is subjected to the vibration test described in 38.1.2:		P
38.1.2	The vibration test shall consist of vibration for one hour at a frequency of 10 to 55 Hz and back to 10 Hz, with a linear sweep having a sweep time of two minutes per sweep cycle. The amplitude shall be 1.0 +0.1, - 0 mm (0.040 +0.004, - 0 inch) p-p displacement limit in a vertical plane.		P
38.1.3	After this test, the representative unit shall be subjected to a minimum of one charge/discharge cycle at the manufacturer's maximum specified values. After this charge/discharge cycle, the unit shall be subjected to an observation period per 26.8.		P
38.1.4	At the conclusion of the observation period, units that contain hazardous operating voltages shall be subjected to a Dielectric Strength Test, Section 30, or an Isolation Resistance Test, Section 29, (without humidity conditioning).		P
38.1.5	As a result of the test, there shall be no indication of fire, explosion, rupture, electrolyte leakage, or shock hazard.		P
38.2	Batteries/battery packs		P
38.2.1	This test evaluates the ability of the battery pack of the eBike to withstand vibration. The test shall be performed in accordance with IEC 60068-2-64, as specified in UL/ULC 2271. For battery packs in compliance with 11.1(a) or 11.1(b), this test is not required.		P

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38.2.2	The battery pack is to be securely mounted to a vibration test platform in a manner similar to how it is oriented during use. The representative battery pack is to be subjected to a random vibration along three perpendicular axes in space in a sequence starting with the vertical axes (Z) and ending with the longitudinal axis (X).		P
38.2.3	The representative battery pack shall be subjected to the vibration in each axis for 21 h. For each axis the frequency shall be varied from 5 Hz to 200 Hz with power spectral density (PSD) for the vertical (Z) axis, the longitudinal (X) axis, and the transverse (Y) axis as outlined in ISO 12405-1.		N/A
38.2.4	If the battery pack is operational after the test, it shall be subjected to a minimum of one charge/discharge cycle at the manufacturer's maximum specified values.		N/A
38.2.5	The test shall be followed by an observation period in accordance with 26.8.		N/A
38.2.6	At the conclusion of the observation period, representative battery packs containing hazardous operating voltages shall be subjected to a Dielectric Voltage Withstand Test, Section 30, or an Isolation Resistance Test, Section 29 (without humidity conditioning).		N/A
38.2.7	As a result of the test, there shall be no indication of any noncompliant results as outlined in 38.1.1.		N/A
39	Strain Relief		P
39.1	General		P
39.1.1	The tests in 39.2 and 39.3 apply to interconnecting cables of a hazardous voltage circuit.		P
39.1.2	Both the Strain Relief – Pull Test and the Strain Relief – Push Back Test are required for each interconnecting cable as specified in 39.1.1.		P
39.1.3	All of the tests can be performed on one representative system, but each test is to be performed individually		P
39.1.4	The internal connections are to be disconnected or cut prior to the tests in 39.2 and 39.3.		P
39.2	Strain relief – pull test		P
39.2.1	The strain relief means provided for each interconnecting cable as specified in 39.1.1 shall withstand a direct pull of 156 N (35 pounds) applied to the cord for one minute without displacement. The strain relief does not comply when at the point of disconnection of the conductors, there is such movement as to indicate that stress on the connections results		P
39.2.2	The weight is to be suspednde from the cable and supported by the unit so that the strain relief means is stressed from andy angle of the unit		P

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39.3	Strain relief – push back test		P
39.3.1	The interconnecting cable as specified in 39.1.1 shall be prevented from being pushed into the product through the cord entry hole where such displacement is likely to:		P
39.3.2	The cable is to be held 25.4 mm (1 inch) from the point where the cable emerges from the unit and is then to be pushed back into the unit. The cable is to be pushed back into the unit in 25.4 mm (1 inch) increments until the cable buckles or the force to push the cable into the unit exceeds 26.7 N (6pounds force). The cable, within the unit, is to be manipulated to the worst case position during the test to determine compliance with 39.3.1.		P
40	Startup Assistance Mode Test		N/A
40.1	EBikes or EPACs provided with a startup assistance mode are to be tested. The startup assistance mode shall have a maximum speed of 6 kph (3.7 mph) and the assistance shall stop when the activation control is released.		N/A
40.2	The representative eBike or EPAC shall be provided with a fully charged battery for this test. The test can be performed on a test track or on a test bench that keeps the assisted wheel free of the ground during the test.		N/A
40.3	Motor current is to be monitored throughout the test. Prior to any start of pedaling (stand by condition), the motor current is measured and recorded. This is considered the no-load current point. During the test, the current to the motor will increase due to motor assist. The test is terminated when the motor returns to this no-load current point.		N/A
40.4	The unit is to be operated for 5 minutes at a speed equal to 80 percent of its marked maximum assistance speed and then the representative eBike or EPAC is stopped. The startup assistance mode is activated and run for 1 minute. At the end of the 1 minute, the maximum speed is recorded.		N/A
40.5	At the end of the 1 minute duration in 40.4, the activation control is released and the motor current is observed. When the motor current returns to the no-load current point, the test is ended.		N/A
41	Motor Assistance Control		P
41.1	General		P
41.1.1	The tests in 41.2, 41.3, and 41.5, are required for all EPACs and all eBikes with an EPAC mode. For eBikes without EPAC mode, the tests in 41.2 and 41.3 do not apply. The test in 41.4 is only required on eBikes and EPACs that are provided with a cutoff feature when braking.		P

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41.1.2	For all tests in Section 41, the term "sample" is considered to apply to the on board electrical system or the complete eBike with the on board electrical system installed. The term refers to all EPACs and to any eBike that is provided with an EPAC function		N/A
41.1.3	When testing at the electrical system level , the distance traveled or speed can be determined inthe test bench by calculation using the number of rotations of a given wheel sizeom UL		N/A
41.2	Reverse Pedaling Test		N/A
41.2.1	The motor assistance shall not be activated when the pedals are operated in reverse. The motor current shall not increase above the no-load current point when tested in accordance with 41.2.2 – 41.2.4.		N/A
41.2.2	The sample shall be provided with a fully charged battery for this test. The test can be performed on a test track or on a test bench that keeps the assisted wheel free of the ground during the test.		N/A
41.2.3	Motor current is to be monitored throughout the test. Prior to any start of pedaling (stand by condition), the motor current is measured and recorded. This is considered the no-load current point.During the test, the current to the motor will increase due to motor assist. The test is terminated when the motor returns to this No-load current point.		N/A
41.2.4	The pedals are operated in reverse and the motor current value is observed. The motor current value is recorded during this operation and shall not exceed the non-assist current value.		N/A
41.3	Pedal Cessation Test for EPACs		N/A
41.3.1	The motor assistance of an EPAC shall cutoff within 2 meters (6.6 feet) of travel distance when the user stops pedaling. The motor current shall decrease to or below the no-load current point within sthose 2 meters.		N/A
41.3.2	The sample shall be provided with a fully charged battery for this test. The test can be performed son a test track or on a test bench that keeps the assisted wheel free of the ground during the test.		N/A
41.3.3	Motor current is to be monitored throughout the test. Prior to any start of pedaling (stand by condition), the motor current is measured and recorded. This is considered the no-load current point.During the test, the current to the motor will increase due to motor assist. The test is terminated when the motor returns to this no-load current point.		N/A

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41.3.4	The sample is operated at 90 percent of the marked maximum assistance speed and then pedaling is ceased. The distance traveled is measured from the time pedaling ceases to the time the motor current is at or below the no-load current point. No braking shall occur during this test.		N/A
41.3.5	With reference to 41.3.4, the distance traveled can be determined in the test bench by calculation using the number of rotations of a given wheel size.		N/A
41.4	Cutoff When Braking Test		P
41.4.1	The motor assistance shall cutoff when the brake device is actuated.		P
41.4.2	The sample shall be provided with a fully charged battery for this test. The test can be performed on a test track or on a test bench that keeps the assisted wheel free of the ground during the test.		P
41.4.3	Motor current is to be monitored throughout the test. Prior to any start of pedaling (stand by condition), the motor current is measured and recorded. This is considered the no-load current point. During the test, the current to the motor will increase due to motor assist. The test is terminated when the motor returns to this no-load current point.		P
41.4.4	The sample is operated at any actuated and the motor current shall be p enient speed for IS decrease . This test is repeated for each41.4.4 The sample isWhile pedaling		P
41.5	Cutoff at Maximum Speed Test		N/A
41.5.1	The motor assistance shall be cutoff on or before the sample obtains the marked maximum assistance speed when tested as indicated in 41.5.2 – 41.5.4.		N/A
41.5.2	The sample shall be provided with a fully charged battery for this test. The test can be performed on a test track or on a test bench that keeps the assisted wheel free of the ground during the test.		N/A
41.5.3	Motor current is to be monitored throughout the test. Prior to any start of pedaling (stand by condition), the motor current is measured and recorded. This is considered the no-load current point. During the test, the current to the motor will increase due to motor assist. The test is terminated when the motor returns to this no-load current point.		N/A

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41.5.4	The sample is to be operated for 5 minutes at a speed equal to 80 percent of its marked maximum assistance speed. After this duration, the speed is increased to the maximum speed the motor will allow but not more than 125 percent of the marked maximum assistance speed. The motor current shall be reduced to the no-load current point when, or before, the maximum speed of the sample reaches the marked maximum assistance speed.		N/A
42	General		P
42.1	The markings required for compliance to this Standard shall be legible and permanent such as etched, adhesive labels, etc. An adhesive-backed label shall comply with UL 969 and CSA C22.2 No.0.15, for the intended exposure conditions and surface adhered to. Alternatively, the label shall be subjected to the Permanence of Marking Test, Section 37.		P
43	Nameplate and Identification		P
43.1	Products shall be marked with the manufacturer's name, trade name, trademark or other descriptive marking which may identify the organization responsible for the product, part number or model number,and electrical ratings.		P
43.2	Products shall be marked with the date of manufacture, which may be in the form of a code that does not repeat within 10 years.		P
43.3	Products that are provided with a battery pack that has its battery management system residing in components or circuits outside the battery pack shall be marked with the charger that is specified for use. An example of such markings would be the following or equivalent "Use Only Charger (_____)." The blank would be filled in with identifying information for the charger.		P
43.4	All external terminals and connections intended to be made in the field, including the battery terminals if the battery pack is not keyed, shall be provided with identification and if applicable, polarity markings.		P
43.5	If a manufacturer produces or assembles eBike systems at more than one factory location, the equipment shall have a distinctive marking – which may be in code – to identify it as the product of a particular factory.		P
44	Cautionary Markings		P
44.1	The words, "CAUTION", "WARNING", OR "DANGER" in a cautionary marking shall be in letters not less than 3.2 mm (1/8 inch) high. The remaining letters in a cautionary marking shall not be less than 1.6mm (1/16 inch) high. The words, "WARNING" or "DANGER" are alternatives for the word, "CAUTION".		P

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44.2	A cautionary marking shall be located on a part that is not removable; or if removable, on a part that impairs the operation of the unit when removed. The marking shall also be visible and legible to the operator during normal operation of the unit.		P
44.3	A cautionary marking shall be located on a part that is not removable; or if removable, on a part that impairs the operation of the unit when removed. The marking shall also be visible and legible to the operator during normal operation of the unit.		P
45	General		P
45.1	A product shall be provided with legible installation instructions, operation instructions, and instructions pertaining to a risk of fire, electric shock, or injury to persons associated with the use of the product. Also, user maintenance instructions and moving and storage instructions associated with the use of the product by the end user shall be included.		P
45.2	The instructions mentioned in 45.1 shall be in separate manuals or shall be combined in one or more manuals when the instructions pertaining to a risk of fire, electrical shock, or injury to persons are separated in format and emphasized to distinguish them from the rest of the text.		P
45.3	An illustration is allowed with a required instruction to clarify the intent but shall not replace the written instruction.		P
45.4	The following items shall be entirely in upper case letters or shall be emphasized to distinguish them from the rest of the text:		P
45.5	Unless otherwise indicated, the text of all instructions shall be in the words specified or words that are equivalent, clear, and understandable. Substitution of the signal word "DANGER" for "WARNING " is allowed, when the risk associated with the eBike is such that a situation exists which		P
46	Instructions Pertaining to a Risk of Fire or Electric Shock		P
46.1	Instructions pertaining to a risk of fire or electric shock shall warn the user of reasonably foreseeable risks and state the precautions to be taken to reduce such risks. Such instructions shall be preceded by the heading, "INSTRUCTIONS PERTAINING TO RISK OF FIRE or ELECTRIC SHOCK" or the equivalent.		P
46.2	Numbering of the items in the list in 46.3 and including other instructions pertaining to a risk of fire, selectric shock, or injury to persons that the manufacturer determines to be necessary and that do not sconflict with the intent of the instructions are acceptable.		N/A

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46.3	The instructions pertaining to a risk of fire, electric shock, or injury to persons shall include those items in the following list that are applicable to the product. The statement "IMPORTANT SAFETY INSTRUCTIONS" or the equivalent shall precede the list, and the statement "SAVE THESE sINSTRUCTIONS" or the equivalent shall either precede or follow the list. The word "WARNING" shall be entirely in upper case letters or shall be emphasized to distinguish it from the rest of the text.		N/A
46.4	The instructions pertaining to a risk of fire, electric shock, or injury to persons, or the installation instructions shall include the following items if applicable. If the following instructions are included in the installation instructions, a reference to these instructions shall be included in the list mentioned in 46.3 as a separate item. The headings and the word "WARNING" shall be entirely in upper case letters or shall be emphasized to distinguish it from the rest of the text.		N/A
47	Installation Instructions		P
47.1	Installation instructions shall contain all the information needed to install the product for use as sintended, and shall be preceded by the heading, "INSTALLATION INSTRUCTIONS" or the equivalent.		P
48	Operating Instructions		P
48.1	Operating instructions shall contain all the information needed to operate the product as intended, and shall be preceded by the heading "OPERATING INSTRUCTIONS" or the equivalent.		P
48.2	Instructions in relation to operating that appear in the instructions pertaining to a risk of fire, electric shock, or injury to persons, are not required to be repeated here; but a reference to those instructions shall be included here.		P
48.3	The instruction manual shall contain the following information:		P
48.4	Instructions shall indicate that charging of the eBike shall only be performed with the manufacturer's recommended charger		P
49	User Maintenance Instructions		P
49.1	Instructions for user maintenance shall include explicit instructions for all cleaning and servicing that are intended to be performed by the user, and shall be preceded by the heading, "USER MAINTENANCE sINSTRUCTIONS" or the equivalent.		P
49.2	For units with user replaceable fuses, the user maintenance instructions shall contain statements concerning fuse replacement instructions and reference to the correct fuse ratings that are to be used.		P

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50	Moving and Storage Instructions		P
50.1	If moving or storage of the product is able to result in damage to the product that could result in a risk of fire, electric shock, or injury to persons during subsequent use, the instructions shall describe the proper moving and storage procedure, and shall be preceded by the heading, "MOVING AND STORAGE INSTRUCTIONS" or the equivalent.		P

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	TABLE: List of critical components				P
Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard (Edition / year)	Mark(s) of conformity1)
Plastic enclosure	LG CHEM LTD	LUMID GP2251BFH(#)	V-0, 130°C	UL 94	UL E67171
Internal wire	Xin Sheng Terminal Mfg Ltd	1007	80 °C, 300V~, 20AWG	UL758	UL E328303
PCB	CHEERFUL PLASTIC ELECTRONIC PRODUCTS	03A	V-0, 130℃	UL 796	UL E199724
Battery	E-Link Technology Co., Ltd	EL-YW1304S	48VDC, 20Ah	UL 1642	UL
Motor	Wuxi Truckrun Motor Co., Ltd.	--	48VDC, 500W	UL 2849	Tested with appliance
AC/DC Power Supply	DONGGUAN ANGDI TECHNOLOGY CO., LTD	BC010546030	Input: 100-240V~, 50/60Hz, 2.5A Output: 54.6VDC, 3.0A	UL 1310	UL

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	Input Test					P
U (V)	I (A)	Irated (A)	P (W)	Fuse #	Ifuse (A)	Condition/status
54.6VDC	2.93	3.0	159.97	--	--	Normal Condition

	TABLE: Thermal requirements			P
	test voltage (V)	charger	discharger	—
	t1 (°C)	22.7	23.4	—
Maximum temperature T of part/at:		T (°C)		allowed T_{max} (°C)
Internal wire		45.6	62.4	80
PCB		55.3	64.7	130
Enclosure		43.7	52.5	70
Motor Winding		24.5	65.7	125
Battery surface		44.8	47.4	Ref.

Supplementary information:

The temperatures were measured under worst case normal mode defined in 1.2.2.1 and as described in sub-clause 1.6.2 and at voltages as described above.

With a rated maximum ambient temperature of 25°C.

For the components temperatures limit, please refer to table 1.5.1.

	TABLE: High Voltage	P
Measured between:	Measured VA	Comments/conditions
Adapter to electric bike	500	No breakon
supplementary information:		

	TABLE: touch current measurement		P
Measured between:	Measured (mA)	Limit (mA)	Comments/conditions
Adapter to electric bike	0.08	0.25	--
supplementary information:			

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	TABLE: Fault condition tests						P
	Ambient temperature (°C) .....:				25°C unless otherwise specified		—
	Power source for EUT: Manufacturer, model/type, output rating .....:				See below		—
Component No.	Fault	Supply voltage (V)	Test time	Fuse #	Fuse current (A)	Observation	
U1 pin1-pin6	SC	54.6VDC	10min	--	--	Unit shut down immediately, no damage, no hazards.	
Motor	Locked	54.6VDC	7hours	--	--	No damage,no hazards.	
Battery	SC	54.6VDC	10min	--	--	Unit shut down immediately, no damage, no hazards.	
Battery	Overcharge	54.6VDC	7hours	--	--	No damage,no hazards.	
Battery	discharge	--	2hours	--	--	No damage,no hazards.	
Supplementary information: 1. SC: short-circuit; OC: open-circuit; OL: overload; 2. The Hi-pot tests were successfully conducted after the completion of fault condition.							

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Appendix 1: Photo document

Photo 1: Overall view

Photo 2: Overall view

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Photo 3: Overall view

Photo 4: Overall view

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Photo 5: Overall view

Photo 6: Overall view

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Photo 7: Overall view

Photo 8: Internall view

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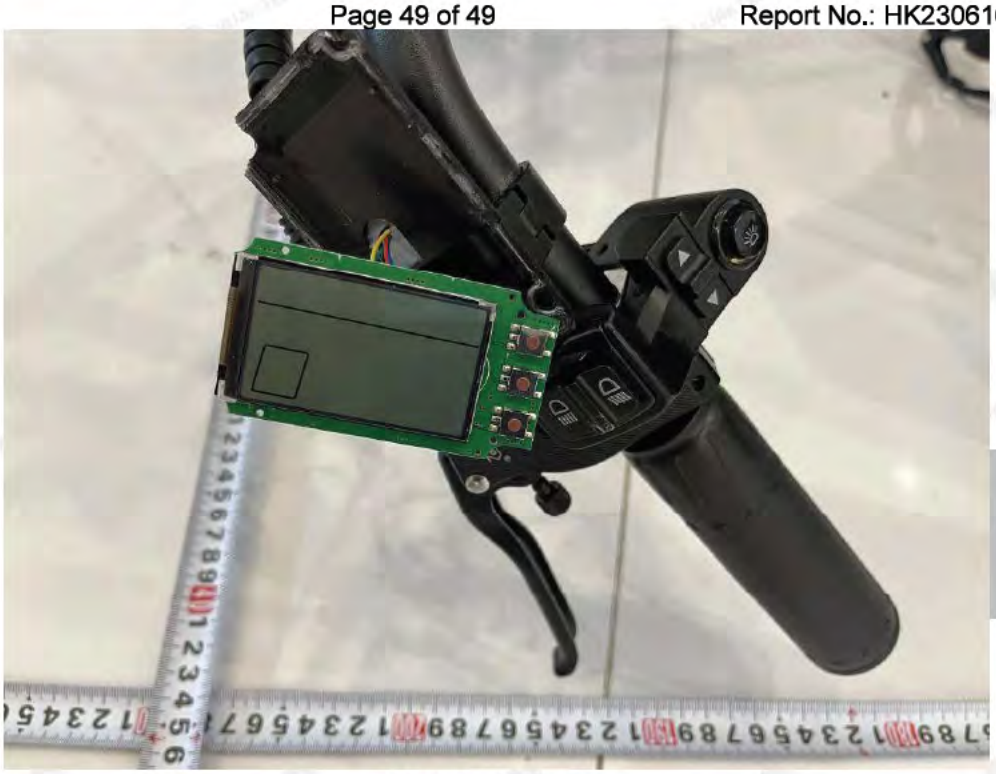

Photo 9: PCB view

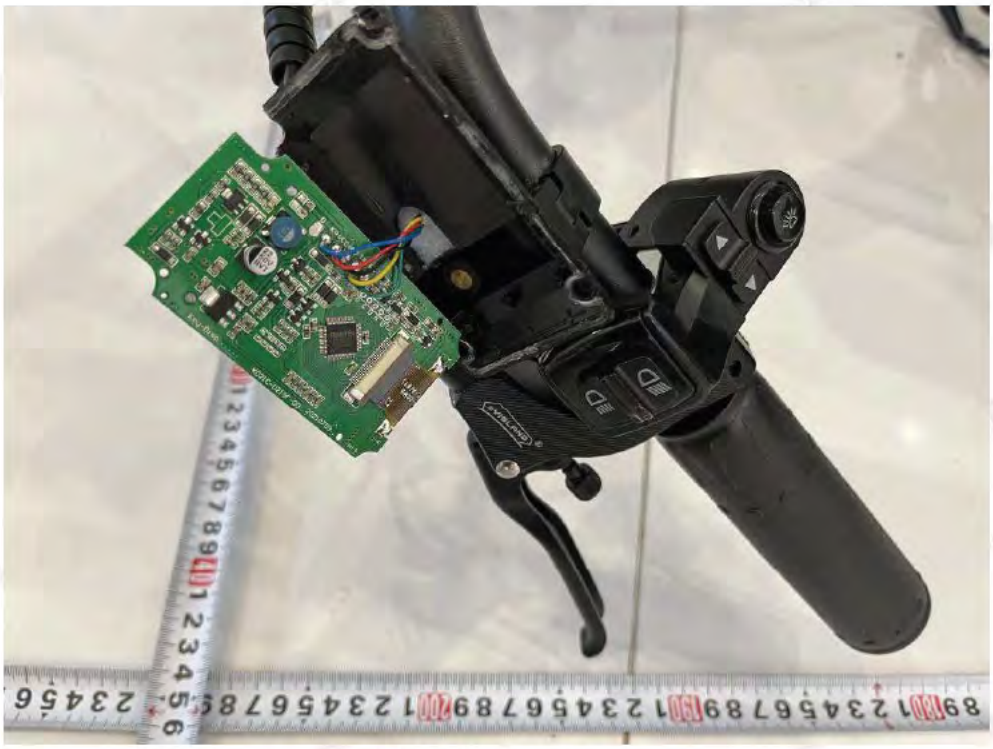

Photo 10: PCB view

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材料安全数据表
Material Safety Data Sheet

报告编号Report No.: S03A23120368M00201

样品名称： Sample Name:	锂离子电池 Lithium-ion Battery
样品型号： Sample Model:	EL-YW1304S
委托单位： Applicant:	深圳市易联科电子有限公司 E-Link Technology Co.,Ltd
签发日期： Issue Date:	2024-01-02

广东储能检测技术有限公司

Guangdong ESTL Technology Co., Ltd.

第一部分 产品和厂商信息 Section 1 Identification of the product and supplier	
样品名称 Sample Name	锂离子电池 Lithium-ion Battery
样品型号 Sample Model	EL-YW1304S
规格 Rating	48V 10.4Ah 499.2Wh
测试实验室 Testing laboratory	广东储能检测技术有限公司 Guangdong ESTL Technology Co., Ltd.
测试地址 Testing Address	广东省东莞市松山湖园区总部二路9号1栋1单元101、201-208 室、4单元201室和11号1栋2单元101室。 Room 101, 201-208, Unit 1, & Room 201, Unit 4, Building 1, No.9/Room 101, Unit 2, Building 1, No.11, Zongbu 2nd Road, Songshanhu Park, Dongguan, Guangdong, China
委托单位 Applicant	深圳市易联科电子有限公司 E-Link Technology Co.,Ltd
委托单位地址 Applicant Address	深圳市宝安区石岩街道石龙社区工业二路 8 号同为光电厂区 B 栋厂房四层五 4-5 Floor,BL.B Tongwei Optoelectronics Factory Area,No.8,Gongye 2nd Road,Shilong,Shiyan Street 518108,Bao’an district,Shenzhen
生产单位 Manufacturer	深圳市易联科电子有限公司 E-Link Technology Co.,Ltd
生产单位地址 Manufacturer Address	深圳市宝安区石岩街道石龙社区工业二路 8 号同为光电厂区 B 栋厂房四层五 4-5 Floor,BL.B Tongwei Optoelectronics Factory Area,No.8,Gongye 2nd Road,Shilong,Shiyan Street 518108,Bao’an district,Shenzhen
鉴定依据 Inspection according to	依据GB/T16483-2008&ISO11014:2009编制 According to GB/T16483-2008&ISO11014:2009
紧急联系电话 Emergency telephone call	18033412128
测试日期 Tested date	2023-12-06 to 2023-12-11
生效时间 Effective Date	2024-01-02

检测 Tested by s47F

审核 Reviewed by s47F

广东储能检测技术有限公司 Guangdong ESTL Technology Co. 4419620021070 报告专用章 Special Seal for Report

批准 Approved by s47F

第二部分 成分/组成信息
Section 2 Composition/Information on Ingredient

危险成分（化学名称） Hazardous Ingredients (Chemical Name)	含量及含量百分比(%) Concentration or concentration ranges (%)	CAS编号 CAS Number
钴酸锂 Lithium Cobalt Oxide	32.7	12190-79-3
聚偏氯乙烯 PVDF	0.5	24937-79-9
铝 Aluminium (Al)	4.2	7429-90-5
碳 carbon	15	7440-44-0
铜 Copper (Cu)	10	7440-50-8
镍 Ni	22	7440-02--0
聚丙烯 Polypropylene	5.4	9003-07-0
六氟磷酸锂 Lithium Hexafluoro- phosphate	2.5	21324-40-3
碳酸二甲酯 Ethylene carbonate	3.7	616-38-6
碳酸乙烯酯 1,3-Dioxolan-2-one	4.0	96-49-1

第三部分 主要危险性鉴定
Section 3 Hazards Identification

爆炸危险性 Explosive risk	该物品不属于爆炸危险品 This article does not belong to the explosion dangerous goods
易燃危险性 Flammable risk	该物品不属于易燃危险品 This article does not belong to the flammable material
氧化危险性 Oxidation risk	该物品不属于氧化危险品 This article does not belong to the oxidation of dangerous goods
毒害危险性 Toxic risk	该物品不属于毒害危险品 This article does not belong to the toxic dangerous goods
放射危险性 Radioactive risk	该物品不属于放射危险品 This article does not belong to the radiation of dangerous goods
腐蚀危险性 Mordant risk	该物品不属于腐蚀危险品 This article does not belong to the corrosion of dangerous goods
其他危险性 other risk	该物品为锂离子电池，瓦时率为 499.2Wh。 This article is the Lithium-ion Battery, Watt hour rate 499.2Wh.

第四部分 急救措施
Section 4 First aid measures

眼睛接触：提起眼皮用大量水冲洗眼睛至少15分钟，立即就医。

After Eye Contact: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

皮肤接触：脱掉被污染的衣服，并用大量水或淋浴冲洗皮肤15分钟，立即就医。

After Skin Contact: Remove contaminated clothes and rinse skin with plenty of water or shower for 15 minutes. Get medical aid.

吸 入：如有吸入，迅速脱离现场至新鲜空气处，如果停止呼吸，进行人工呼吸。如果呼吸困难，供给氧气。

After Inhalation: If inhaled, quickly leave the site to fresh air. If you stop breathing, perform artificial respiration. If breathing is difficult, supply oxygen.

食 入：如有知觉，请用水冲洗口腔， 就医。

After Ingestion: If swallowed, wash out mouth with water provided person is conscious Call a physician.

第五部分 消防措施
Section 5 Fire-fighting measures

危险特性：在火灾时可释放有害浓烟、气体或者蒸汽。

Characteristics of Hazard: Toxic fumes; gases or vapors may evolve on burning.

有害燃烧产物：一氧化碳和二氧化碳、HF、氟磷化物。

Hazardous Combustion Products: CO,CO_2, HF, phosphorus fluoride.

灭火方法及灭火剂：对锂电池，大量冷水是一个有效的灭火剂。不要使用温或热水。不要使用哈龙类灭火材料。可使用干粉、沙、土。

Fire-extinguishing Methods and Extinguishing Media: Copious amounts of cold water are an effective extinguishing medium for lithium batteries. Don't use warm or hot water. Don't use Halon type extinguishing material.

May use dry powder, sand, earth.

灭火注意事项：消防人员须佩戴防毒面具、穿全身消防服。

Attention in Fire-extinguishing: The Firemen should put on antigas masks and full fire-fighting suits.

第六部分 泄漏应急处理
Section 6 Accidental release measures

当电池发生泄漏，液体可以用砂，土，或其他惰性物质吸收，受污染的区域应同时通风。

When leakage of batteries happens, liquid could be absorbed with sands, earth, or other inert substance, and the contaminated area should be ventilated meantime.

未放热或燃烧的破损电池，应装入密封的塑料袋或容器。

Damaged batteries that are not hot or burning should be placed in a sealed plastic bag or container.

第七部分 操作处置和储存
Section 7 Handling and storage

操作注意事项：储存时远离食物和水源。吃饭喝水前彻底清洗双手。储有化学物的容器搬用时需防止静电的产生和积聚。

Precautions for safe handling: Consumption of food and beverage should be avoided in work areas. Wash hands with soap and water before eating, drinking. Ground containers when transferring liquid to prevent static accumulation and discharge.

有关火灾及防止爆炸的资料：电池在拆开、挤压、遇火或高温情况下，会引起起火或爆炸，严禁短路或非正确操作。

Information about fire and explosion protection: Batteries may explode or cause burns, if disassembled, crushed or exposed to fire or high temperatures. Do not short or install with incorrect polarity.

储存注意事项：储存在一个低温，干燥，通风良好的环境。远离热源，避免长时间阳光照射。未使用时密封容器。

Conditions for safe storage, including any incompatibilities: Requirements to be met by storerooms and receptacles. Store in a cool, dry, well-ventilated place. Keep away from heat, avoiding the long time of sunlight.

第八部分 接触控制 / 个人保护
Section 8 Exposure controls/personal protection

最高容许浓度：没有适用标准

Maximum Allowable Concentration: No Standard available

工程控制：操作未破损的电池，没有工程控制要求。对于破损的电池，个人防护用品应包括 化学品防护手套和安全眼镜。

Engineering Controls: no engineering controls are required for handling batteries that have not been damaged. Personal protective equipment for damaged batteries should include chemical resistant gloves and safety glasses.

第九部分 理化特性
Section 9 Physical and Chemical Properties

有关基本物理及化学特性的信息 Information on basic physical and chemical properties	
外观Appearance	黑色 Black
形状Form	不规则 Irregularity
气味Odour	无味 Odorless

第十部分 稳定性和反应活性
Section 10 Stability and reactivity

稳定性：常温常压稳定。

Stability: Stable under normal temperatures and pressures.

禁配物：氧化剂。

Incompatibility: Oxidizing agents.

避免接触的条件：热和明火、短路和水。

Conditions to Avoid: Heat and open flame, short circuit, and water.

聚合危害：不会发生。

Hazardous polymerization: Will not occur.

分解产物：一氧化碳、二氧化碳、HF、氟磷化物。

Decomposition Products: CO, CO_2, HF, Phosphorus fluoride.

第十一部分 毒理性资料
Section 11 Toxicological information

标志及症状：无，除非电池破裂。

Signs & symptoms: None, unless battery ruptures.

内部物质暴露的情况下，蒸汽烟雾可能对眼睛和皮肤的刺激性。

In the event of exposure to internal contents, vapour fumes may be very irritating to the eyes and skin.

吸入：对肺有刺激性。

Inhalation: Lung irritant.

皮肤接触：对皮肤刺激性。

Skin contact: Skin irritant.

眼睛接触：对眼睛有刺激性。

Eye contact: Eye irritant.

食入：吞下中毒。

Ingestion: Poisoning if swallowed.

下列情况下会危险人员身体健康：如果与电池内部材料直接接触，皮肤可能会出现干燥、灼烧等 轻微或严重的刺激，并且损坏靶器官的神经，肝脏和肾脏。

Medical conditions generally aggravated by exposure: In the event of exposure to internal contents, moderate to server irritation, burning and dryness of the skin may occur, Target organs nerves, liver and kidneys.

第十二部分 生态学资料
Section 12 Ecological information

生态毒性： 无

Ecological Toxicity: N/A

生物降解性：无

Biodegradability: N/A

非生物降解性：无

Non-biodegradability: N/A

其它有害作用：该物质对环境有无明显危害。

Other Hazardous: Will not effect environmental evidently。

第十三部分 废弃处置
Section 13 Disposal consideration

废弃处置方法：建议遵照国家和地方法规处置或再利用。

Waste Treatment: Recycle or dispose of in accordance with government, state & local regulations.

废弃注意事项：废电池不能被当作普通垃圾。不能扔进火中或置于高温下。不能解体，刺穿，破碎或类似的处理。最好的办法是回收利用。

Attention for Waste Treatment: Deserted batteries couldn't be treated as ordinary trash.

Couldn't be thrown into fire or placed in high temperature. Couldn't be dissected, pierced, crushed or treated similarly. Best way is recycling.

第十四部分 运输信息
Section 14 Transport information

UN 编号 UN NO.	UN3480 UN3481 UN3171
运输专有名称 Proper Shipping Name	UN3480 锂离子电池 UN3480 Lithium Ion Batteries UN3481 锂离子电池与设备打包 UN3481 Lithium Ion Batteries Packed With Equipment UN3171 以电池为动力的车辆 UN3171 Battery-powered vehicle
运输标签 Label for conveyance	锂电池操作标签 Lithium Battery Label 9类危险品标签 Class 9 Hazard Label 仅限货机标签 Cargo aircraft Only Label

危险品规例规定，运输前，每一个电池设计通过联合国《试验和标准手册》第七版第38.3节测试。报告编号：S03A22090282U00201。

The dangerous goods regulations require that each battery design be subject to tests contained in UNITED NATIONS the "Manual of Test and Criteria" (ST/SG/AC.10/11/Rev.7) Section 38.3.

Report No.: S03A22090282U00201.

危险性分类：

该电池包装应遵守IATA DGR 65版包装说明965/966/952的运输要求。

The package of battery should be complied with the requirements of Packing Instruction 965/966/952 of IATA DGR 65th Edition for transportation.

该电池包装遵守IMDG-CODE（41-22）。

The package of battery should be complied IMDG-CODE (41-22)。

第十五部分 法规信息
Section 15 Regulation information

法规信息：

联合国《关于危险货物运输的建议书 规章范本》（22版）、国际航空运输协会 《危险品规则》（65版）、《国际海运危险货物规则》（IMDG-CODE）（41-22版）、《国际危险货物道路运输欧洲协定》（ADR）（2023版）、《国际危险货物铁路运输欧洲协定》（RID）（2023 版）

Regulatory information: Recommendations on the transport of dangerous goods-model Regulations 22nd or 22nd, IATA dangerous goods regulations 65th, International Maritime Dangerous Goods Code (41-22), European Agreement concerning the International Carriage of Dangerous Goods by Road (2023), Regulations concerning the International Carriage of Dangerous Goods by Rail (2023)

第十六部分 其他信息
Section 16 Other information

此信息并非对所有由深圳市易联科电子有限公司生产的电池均有效。此信息来自可靠来源，但不对所包含信息的完整性和准确性做任何保证。广东储能检测技术有限公司对因电池使用不当造成的任何损坏或损失不承担任何责任，用户应掌握正确的使用方法并对电池的使用负责。

This information is not effective to all the batteries manufactured by E-Link Technology Co.,Ltd. This information comes from reliable sources, but no warranty is made to the completeness and accuracy of information contained. Guangdong ESTL Technology Co., Ltd. doesn't assume responsibility for any damage or loss because of misuse of batteries. User's should grasp the correct use method and be responsible for the use of batteries.

Photos of Samples and Labels/样品照片及标识

--- 报告结束 ---

--- End of Report ---

声明
Declaration

1. 本报告无批准人、审核人及检测人签名无效。

   The test report is invalid without the signatures of Ratifier, Reviewer and Testing engineer.

2. 对检验报告若有异议，应于收到报告之日起十五天内向检验单位提出。

   Objections to the test report must be submitted to ESTL within 15 days.

3. 未经本试验室书面同意，不得部分地复制本报告。

   Nobody is allowed to photocopy or partly photocopy this test report without written permission of ESTL.

4. 本报告仅对送检样品负责。

   The test report is valid for the tested samples only.

5. 本报告涂改无效。

   The test report is invalid if altered.

Australian Government

Department of Infrastructure, Transport, Regional Development, Communications and the Arts

s47F

VSS.NCE.15.01.01

Decision to issue an Advisory notice that a thing is not a road vehicle
Road Vehicle Standards Rules 2019, section 233

Advisory notice number NARV-2024-0007540

I, s22(1)(a)(ii) have decided to issue s47F an Advisory notice that a thing is not a road vehicle (Advisory notice) under section 233 of the Road Vehicle Standards Rules 2019 (the Rules) on the basis that I am satisfied that the vehicle applied for is not a road vehicle.

Certain restrictions may apply to using vehicles that are not road vehicles on public roads or road related areas in your local community. Your state or territory transport authority will have further information about any requirements.

When collecting your vehicle please provide this letter to the Australian Border Force for clearance and validation that the department has assessed your application and deemed your vehicle not to be a road vehicle.

Vehicles that are not road vehicles must not be supplied to the market or sold to another person or business for use in transport on public roads within the meaning of the Road Vehicle Standards Act 2018; doing so may be an offence under Road Vehicle Standards legislation. Any false or misleading information provided to support your application may make you liable under the Act as committing an offence.

This Advisory notice comes into force from the date of this decision. This notice expires two (2) years from the date it is issued.

The Advisory notice will not be published on our website but the Secretary (or delegate) may disclose it to others in limited circumstances, for example to assist other regulators, or under a Freedom of Information request (in some circumstances), or subpoena.

Note: Goods containing asbestos

Importation to Australia of asbestos, or goods containing asbestos, is prohibited pursuant to Regulation 4C of the Customs (Prohibited Imports) Regulations 1956 unless a permission or exemption has been granted or a lawful exemption applies.

https://www.abf.gov.au/prohibited-goods-subsite/files/fs-asbestos-risk-importing-vehicle.pdf

Description of vehicle

Vehicle	Make	Model
Other	MACFOX	M21 (X2)

If the vehicle identified in this notice has a VIN, and that VIN is on the RAV, then this notice is not applicable to the vehicle.

Any change to the design and/or specifications of this vehicle prior to importation will mean that the Notice is not applicable.

Contact us

For further information, please consult the contact us information on the website for the department.

s22(1)(a)(ii)

Delegate of the Secretary
Vehicle Safety Operations Branch
Department of Infrastructure, Transport, Regional Development, Communications and the Arts

14/01/2025

Australian Government
Department of Infrastructure, Transport, Regional Development, Communications and the Arts

Freedom of Information Request FOI 25-250

Not A Road Vehicle (NARV) Application for the Segway Xyber, including correspondence

April 2025

NARV Application – NARV-2024-0006377

Application Details

Application Type	NARV
Submitted On	9 August 2024 at 12:01 PM

Applicant Details

Title	s47F
First Name	
Last Name	
Date of Birth	
Email Address	
Mobile Phone	

Address Details

Address Type	s47F
Address Line 1	
Address Line 2	
Town/Suburb	
State/Territory	
Postcode	
Country	

Address Type	s47F
Address Line 1	
Address Line 2	
Town/Suburb	
State/Territory	
Postcode	
Country	

Vehicle Details

Make	Segway
Model	Xyber
Manufactured Year	2024

Vehicle Class

Which of the following vehicle classes does your thing belong to?	Other
What is this vehicle designed to be used for?	Offroad e-bike

Vehicle Features

Does your vehicle have any of the following features? Select all that apply.	Direction indicators: Brake lights: Rear vision mirrors: Registration plate mounting: Seat belts: Fully enclosed cabin with doors: None of the above:
Can your vehicle exceed a speed of 25 km/h on a flat road?	Yes

Advisory Notice Details

Please provide the manufacturer's brochure or specifications for the thing that is not a road vehicle	https://ebike.segway.com/Image_20240726155627.png
Please upload images which identify the vehicle for which you are seeking an advisory notice. This should include front, side and rear images in order to provide coverage of the whole vehicle	SegwayXyber.jpeg
Comments and any other matters	SEGWAY Xyber is an Off-road Sport performance E-bike

Declaration

I declare that the information supplied is true, complete and accurate and that the applicant has not omitted any matter or thing without which the application would be misleading in any material particular. I understand that it may be a contravention under section 32 of the Act to provide false or misleading information. I understand that further information may be requested to support this application. I understand that the Secretary may refuse to consider this application, if the application is not accompanied by the documents specified as required in the application and the application fee. **(and) If submitting the application on behalf of the applicant, an agent or broker will also complete the following declaration:** I am authorised by the applicant to make this declaration on their behalf.
☑ I, being the applicant, or the person authorised to make the declaration on behalf of the applicant, agree to the above and by checking this box, I acknowledge that I am signing this declaration.

Request for Information – Correspondence

RFI-NARV-2024-0006377-1 - Request for Information

s47G(1)(a)

[redacted]

RFI-NARV-2024-0006377-1-1 - RFI Response

s47G(1)(a)

[redacted]

RFI-NARV-2024-0006377-2-Request for Information

s47G(1)(a)

[redacted]

s22(1)(a)(ii)

s22(1)(a)(ii)

Price USD	2699
Brand	Segway
Model	Xyber
Range	75
Top Speed	60
Weight (KG)	55
Motor	Hub wheel
Rated power	1500w
Peak power	3000w
Volt	48v
Capacity	1500wh
Fork	Inverted front fork
Shock	rear suspension
Brakes	dual piston hydraulic disc
Throttle	half grip
Sonsor	cadence
Gear shift	--
Wheel diameter	20
Type	5.0

From: s47F
Sent: Friday, 30 August 2024 11:10 AM
To: ROVERinfo; s47F
Subject: Re: Application Assessment [SEC=OFFICIAL]

Follow Up Flag: Follow up
Flag Status: Completed

Categories: s22(1)(a)(ii)

Hello s22(1)(a)(ii), thank you for the response.

Both these vehicles are electric mountain bikes and are not for road use. There are many bikes with same specification for sale currently in Australia. (Same motor power and same speed even faster.)

The SEGWAY bikes will be speed limited and not sold as road bikes. They are in no way to be used on road, but solely for recreational off road mountain biking.

Can you please advise which pathway to take to obtain an advisory notice please.
Do I need to re-submit for clearer information?

Thank you in advance,
s47F

From: ROVERinfo
Sent: Friday, 30 August 2024 8:00 AM
To: s47F ; ROVERinfo
Subject: RE: Application Assessment [SEC=OFFICIAL]

OFFICIAL

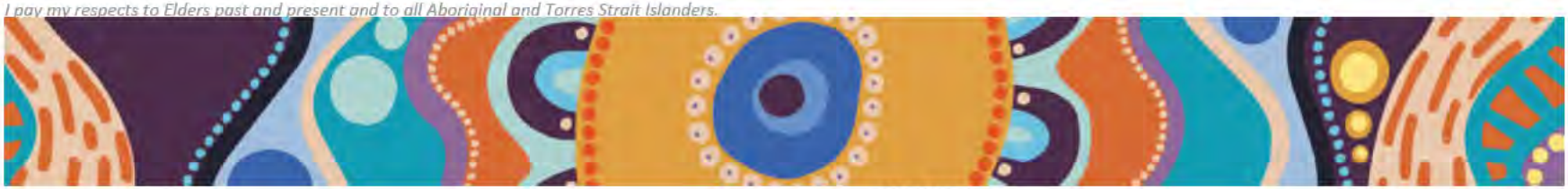
Good morning,
As per the assessment team's response, these devices are not exclusively for off road use – they do not meet the requirements for advisory notice.

If the devices do not meet a pathway they may not be able to be imported.
Kind Regards,

s22(1)(a)(ii) • Application Assessment and Approvals • Vehicle Safety Operations Branch
P 1800 815 272
GPO Box 594 Canberra, ACT 2601
Department of Infrastructure, Transport, Regional Development and Communications and the Arts
CONNECTING AUSTRALIANS • ENRICHING COMMUNITIES • EMPOWERING REGIONS

infrastructure.gov.au

I would like to acknowledge the traditional custodians of this land on which we meet, work and live.
I recognise and respect their continuing connection to the land, waters and communities.
I pay my respects to Elders past and present and to all Aboriginal and Torres Strait Islanders.



OFFICIAL

From: s47F
Sent: Thursday, 29 August 2024 4:10 PM
To: ROVERinfo
Cc: s47F
Subject: Application Assessment

Hello s22(1)(a)(ii)
I am writing this email to explain the two below applications.
s22(1)(a)(ii)
NARV-2024-0006377
I have submitted applications to import samples of two SEGWAY mountain bikes.
Once we deem a good fit for the AU market we will look to import in commercial quantity's. (I understand there is another application for this.)
Both these bikes are designed for "off road" use only and are no way designed for road use or to be road registered vehicles.
They are for recreational use and are typical electric mountain bikes.
Both bikes will be speed limited to a max speed of 25kph. These bikes will be modified for Australian standard.
s22(1)(a)(ii) . Thank you for your consideration.

Regards,
s47F

s47F [redacted]

s47G(1)(a) [redacted]

Australian Government

Department of Infrastructure, Transport, Regional Development, Communications and the Arts

VSS.NCE.15.02

s47F

By email: s47F

CC:

Decision to refuse to issue an Advisory notice that a thing is not a road vehicle under Road Vehicle Standards Rules 2019, section 233

I, s22(1)(a)(ii) have decided not to issue s47F, an Advisory notice that a thing is not a road vehicle under section 233 of the Road Vehicle Standards Rules 2019 (the Rules) on the basis that I am not satisfied that the vehicle applied for is not a road vehicle.

The reason(s) that I am not satisfied that the vehicle applied for is not a road vehicle are as follows:

I have assessed the application to import a 2024 Segway Xyber under the Advisory Notice - Not a Road Vehicle Option and your application is unable to meet this requirement due to:

- Under the Advisory Notice that a thing is not a road vehicle, you do not meet the determination as the 2024 Segway Xyber, fails the requirement that it should not be capable of exceeding 25km/h assisted on level ground.

You may request that I provide detailed reasons for the decision. Such a request must be made in writing to ROVERinfo@infrastructure.gov.au quoting the reference number near the top of this document. We will provide detailed reasons within 28 days of your request. You may also apply to the Administrative Appeals Tribunal (AAT) for review of the decision. Please see https://www.aat.gov.au/ for further information.

Note: Goods containing asbestos

Importation to Australia of asbestos, or goods containing asbestos, is prohibited pursuant to Regulation 4C of the Customs (Prohibited Imports) Regulations 1956 unless a permission or exemption has been granted or a lawful exemption applies.

https://www.abf.gov.au/prohibited-goods-subsite/files/fs-asbestos-risk-importing-vehicle.pdf

Vehicle	Year	Make	Model
Offroad e-bike	2024	Segway	Xyber

If you decide to import this vehicle you are required to apply for a single road vehicle import approval. Further information about single road vehicle import approvals is at:

https://www.infrastructure.gov.au/vehicles/imports/

Applications for single road vehicle import approval are available at:

https://rover.infrastructure.gov.au/

Contact us

For further information, or to contact us regarding matters that are not listed in the ROVER portal, please email ROVERinfo@infrastructure.gov.au, see http://infrastructure.gov.au/vehicles, or call us Monday to Friday 9:00am to 5:00pm AEST:

- 1800 815 272 (free call within Australia)
- +61 2 6274 7444 (outside Australia)

s22(1)(a)(ii)

Delegate of the Secretary
Vehicle Safety Operations Branch
Department of Infrastructure, Transport, Regional Development, Communications and the Arts

08/11/2024